BRITISH MEDICAL JOURNAL

LONDON SATURDAY JUNE 11 1938

THE CLINICAL ASPECTS OF THE TRANSMISSION OF THE EFFECTS OF NERVOUS IMPULSES BY ACETYLCHOLINE *

BY

FRANCIS R. FRASER, M.D., F.R.C.P.

Professor of Medicine, University of London; Director of the Department of Medicine, British Postgraduate Medical School

LECTURE I

Physiology of Acetylcholine

The brilliant researches by Loewi and Dale and their co-workers since 1921 have built up step by step a firm structure upon which rests the belief that acetylcholine transmits the effects of nervous impulses from the nerve endings to the organs throughout a large part of the body. It is not necessary for the purpose of these lectures to review this evidence, for a number of able, exhaustive, and critical accounts have been published recently (Loewi, 1933; Alles, 1934; Dale, 1934, 1935, 1937; Bacq, 1935; Gaddum, 1936;; Brown, 1937; and Cannon and Rosenblueth, 1937), but the main conclusions will be briefly recounted.

When a new principle is established that clarifies our understanding of the processes by which the body normally functions and indicates an essential link in the chain of events that lead to the actions of our organs in health, clinicians should consider whether this new principle may not throw light on some abnormality of function that is observed in disease, for if some deviation from the normal process should occur it may be expected to produce abnormalities of function, with accompanying signs or symptoms. Furthermore, when, as in this instance, the new physiological principle involves the presence of a chemical substance which has specific and striking effects when administered to the animal body, the investigation of its action on human beings in health and disease is clearly indicated in an endeavour to utilize the newly discovered pharmacological effects for cure or alleviation of ill-health.

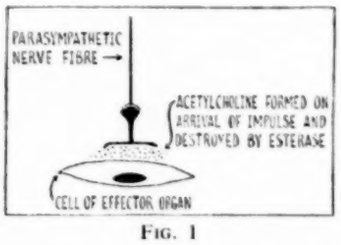

PARASYMPATHETIC NERVE FIBRE
ACETYLCHOLINE FORMED ON ARRIVAL OF IMPULSE AND DESTROYED BY ESTERASE
CELL OF EFFECTOR ORGAN

FIG. 1

I propose in this first lecture to describe briefly what is now the accepted place of acetylcholine in the normal functioning of the body and the conditions that modify its actions; to describe the effects of administering it to animals under experimental conditions, the effects in more detail of administering it to normal human beings, and the attempts that have been made to use it for therapeutic purposes.

The transmission by acetylcholine occurs in its simplest form between the nerve endings of the parasympathetic or cranio-sacral portion of the autonomic nervous system and the effector organs supplied by it, and Fig. 1 shows diagrammatically what is believed to occur. On the arrival of the impulse at the nerve endings, acetylcholine is formed and transmits the effect of the nerve impulse to the cell of the effector organ, producing in it its physiological action, whether that be stimulation or inhibition. Since the effect of such a nerve impulse is short-lived it is unlikely that acetylcholine is there previous to the arrival of the impulse, and it must be rapidly removed or destroyed following the impulse.

ORIGIN OF ACETYLCHOLINE

How the acetylcholine is produced is still uncertain. It may be set free from a preformed compound or it may be synthesized by the arrival of the impulse. Brown (1937) has summarized what is known of its storage and liberation, and Mann, Tennenbaum, and Quastel (1938) have recently brought forward evidence pointing to the presence in the brains of rats of a precursor which is synthesized during tissue respiration in the presence of glucose, which is itself inactive, and from which acetylcholine can be set free by denaturing tissue proteins. Their work is suggestive, but in the meantime the origin of the acetylcholine set free on the arrival of a nerve impulse must be regarded as unknown.

DESTRUCTION BY ESTERASE

The extraordinary evanescence of the action of acetylcholine was noted by Dale (1914), and he suggested that it was rapidly hydrolysed by an esterase. This has been confirmed by a number of workers (Loewi, 1921, 1922; Loewi and Navratil, 1926; Galehr and Plattner, 1927), and the action of the esterase has been carefully studied by Matthes (1930). Its specificity for choline esters was demonstrated by Stedman, Stedman, and Easson (1932), and Plattner and Hintner (1930) determined its distribution in the organs and tissues of the body. The choline esterase activity of sera from normal man and from patients has been estimated by Lucas, Hall, and Ettinger (1935), Verebély (1936), and McGeorge (1937), but owing to technical difficulties it has not been possible to assess the esterase activity at parasympathetic endings, though

* The Croonian Lectures delivered before the Royal College of Physicians of London on May 24, 26, and 31, 1938.

Brücke (1937) has shown that sympathetic ganglia contain considerable amounts of choline esterase. It is therefore probable that, following the arrival of the impulse at the nerve endings, the acetylcholine is produced, transmits the effect of the impulse, and is almost immediately destroyed by the choline esterase present locally in the tissue.

ACTION OF PHYSOSTIGMINE

Loewi and his co-workers observed that the rapid hydrolysis of acetylcholine was inhibited by physostigmine (eserine). This inhibition has been studied by Engelhart and Loewi (1930) and by Matthes (1930), who showed that physostigmine could inhibit the action of choline esterase in as low a concentration as one part in 30 millions and that the action is reversible, the esterase activity being restored when the physostigmine is removed by dialysis. Jones and Todd (1935) found that the subcutaneous injection of physostigmine in man depressed the esterase activity of human serum. This action of physostigmine has been of great importance in proving the presence of acetylcholine following stimulation of nerves, for by preventing the rapid destruction of the ester the addition of physostigmine to perfusion fluids has enabled acetylcholine to be identified in the perfusion fluid following nerve stimulation. Further, the addition of physostigmine causes an intensification and prolongation of the effects of acetylcholine, an action which is specific for choline esters and is utilized in the recognition and identification of choline esters or of acetylcholine itself. This action of physostigmine throws light on its established therapeutic uses as a parasympathetic stimulator and is shared by a substance of similar composition, prostigmin, a synthetic compound that has already found an important place in therapeutics.

ACTION OF ATROPINE

The effects following injection of acetylcholine into the circulation had an important role in the development of the knowledge of the action of that substance as transmitter of the effects of nervous impulses, and it was noted by Dale (1914) that many of the pharmacological results could be prevented by atropine. Many of the effects of nerve stimulation where acetylcholine is believed to be the transmitter are similarly prevented by atropine, and Loewi and Navratil (1924) showed that even where atropine prevents these effects, as in the frog's heart, it does not prevent the appearance of acetylcholine. Atropine therefore inhibits the effect of acetylcholine on the cell of the

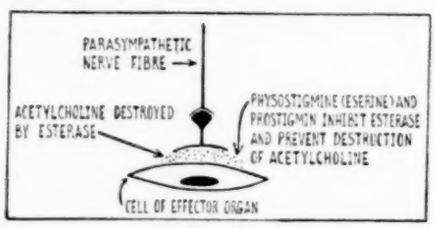

PARASYMPATHETIC NERVE FIBRE
ACETYLCHOLINE DESTROYED BY ESTERASE
PHYSOSTIGMINE (ESERINE) AND PROSTIGMIN INHIBIT ESTERASE AND PREVENT DESTRUCTION OF ACETYLCHOLINE
CELL OF EFFECTOR ORGAN

FIG. 2

effector organ but not the production of the acetylcholine on the arrival of the impulse at the nerve endings. The actions of physostigmine and of atropine on acetylcholine transmission are shown diagrammatically in Figs. 2 and 3.

At certain sites where acetylcholine is believed to be the transmitter, atropine, while preventing the effects of injected acetylcholine, does not prevent the effects of nerve stimulation. This lack of uniformity in atropine inhibition has created difficulties in the acceptance of acetylcholine as the transmitter at these places where atropine fails to inhibit the effects of nerve stimulation. Dale and Gaddum (1930) pointed out that the potentiation by physostigmine of the effect of nerve impulses in these instances undoubtedly indicated transmission by a choline ester, and suggested that "in such cases the nerve impulses liberate acetylcholine so close to the reactive structures that atropine cannot intervene, whereas it can prevent its access to them when it is artificially supplied from without."

At certain other sites of acetylcholine transmission atropine not only fails to prevent the effects of nerve stimulation but fails to inhibit the action of injected acetylcholine. At these situations the association between the

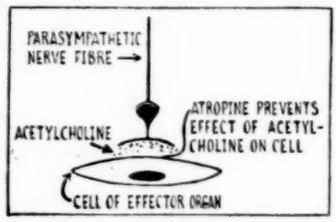


FIG. 3

nerve endings and the effector cells may be still more intimate.

The action of atropine in relation to acetylcholine transmission accounts for many of its pharmacological actions and of its therapeutic uses, which are based in most instances on its capacity to inhibit parasympathetic effects.

DISTRIBUTION OF CHOLINERGIC NERVES

The nerves whose effects are transmitted by acetylcholine do not belong to any anatomical group, and Dale (1933) has suggested the term "cholinergic" for their designation, the term "adrenergic" being applied to the nerves whose effects are transmitted by adrenaline or some other chemical substance closely allied to adrenaline.

The cholinergic nerves may be subdivided into those whose action resembles the effects of the administration of muscarine, and those whose action resembles the effects of nicotine. In most instances the muscarine-like transmissions can be prevented by atropine, while in no instance is the nicotine-like transmission prevented by atropine; but the important distinctions between the two types of transmission are found in the latent period, duration and localization of response, and potentiation by physostigmine. In the muscarine-like transmission the latent period is longer, the duration of the effect is longer, the effect is less strictly localized, and physostigmine produces constantly an increase in the magnitude and duration of the response.

As the result of experiments on mammals, the cholinergic nerves with a muscarine type of transmission are found to include the post-ganglionic fibres of the parasympathetic or cranio-sacral autonomic system. The following actions belong to this group:

(*a*) Constriction of the pupil by oculomotor fibres.
(*b*) Salivation by the chorda tympani.
(*c*) Cardiac inhibition by the vagus.
(*d*) Bronchial constriction by the vagus.
(*e*) Increased tone and contraction of oesophagus, stomach, small intestine, colon, and rectum by the vagus and the sacral outflow.
(*f*) Contraction of the bladder by the sacral outflow and pelvic nerves.
(*g*) Slight contraction of the uterus by the sacral outflow and pelvic nerves.

(*h*) Vasodilatation through the chorda tympani and (in some animals) in the distribution of the vagus.

(*i*) Vasodilatation in the external genital organs by the sacral outflow and nervi erigentes.

Of these, constriction of the pupil, stimulation of the salivary glands, cardiac inhibition, and bronchial constriction are inhibited by atropine. There is still doubt as to the effect of atropine on the nervous impulses to the stomach, but the action on the intestines, bladder, and uterus, and the vasodilator effects of the chorda tympani and nervi erigentes are not inhibited by atropine.

Other cholinergic nerves with a muscarine type of transmission are:

(*j*) The post-ganglionic sympathetic fibres to the sweat glands.

(*k*) Sympathetic vasodilators to the muscles.

In both of these the effects of nerve stimulation are abolished by atropine.

(*l*) The antidromic vasodilator impulses conveyed by sensory nerves to the cutaneous vessels are cholinergic but are not inhibited by atropine.

In view of the vasodilator effect of choline esters when administered by injection, producing generalized vascular dilatation involving the vessels of the skin, muscles, kidneys, lungs, liver, and brain, it is probable, as Brown (1937) suggests, that vasodilators throughout the body are cholinergic.

The cholinergic nerves with nicotine-like transmission are:

(i) All preganglionic fibres, acetylcholine acting as the transmitter at ganglionic synapses, both in the parasympathetic and in the sympathetic autonomic system.

(ii) The motor nerves to the skeletal muscles, acetylcholine being the transmitter at the neuro-muscular junction.

For technical reasons it has not been possible to demonstrate the production of acetylcholine at the ganglionic synapses of the parasympathetic system, where the ganglia are situated close to the effector organ and the post-ganglionic fibres are short, but there is evidence from the regeneration experiments of Langley and Anderson (1904) indicating that transmission at these ganglia is the same as at the sympathetic ganglia. Embryologically the medulla of the adrenal body is analogous to sympathetic ganglia, and stimulation of the sympathetic fibres to the adrenal body, with the resulting secretion of adrenaline, has been shown to be accompanied by the production of acetylcholine.

(iii) The nerves to the adrenal medulla are thus similar to preganglionic sympathetic fibres, and are cholinergic and of the nicotine type.

All neurones leaving the central nervous system are thus seen to be cholinergic, and the only effector peripheral nerves that are not cholinergic are the post-ganglionic fibres of the sympathetic system. But the post-ganglionic sympathetic fibres to the sweat glands and the post-ganglionic sympathetic vasodilator fibres to muscles are cholinergic; and in addition the antidromic vasodilator impulses through sensory nerves to the cutaneous vessels of the limbs are cholinergic.

The diagram published by Dale (1934) illustrates concisely this distribution of cholinergic fibres.

Pharmacology of Acetylcholine

The effects of acetylcholine when administered to animals under experimental conditions afforded valuable evidence that suggested the possibility of this substance acting as a chemical transmitter, and strongly supported the part played by it in physiological processes. Hunt and Taveau (1906) observed its prompt depressor effects. Dale (1914) studied its actions in cats, anaesthetized or with the brain destroyed, and found that while very small doses (0.0001 mg.) by intravenous injection produced a fall of blood pressure through vasodilatation, larger doses (0.01 mg.) caused a slowing of the heart followed by quickening. It stimulated contraction of the unstriped muscle of the digestive tract, caused the bladder to contract, constricted the bronchioles, produced miosis, and increased the flow of tears, saliva, and pancreatic juice. It also produced sweating on the pads of the cat's foot. All these actions could be prevented or diminished by atropine.

MUSCARINE-LIKE AND NICOTINE-LIKE ACTIONS

Following the administration of atropine, larger doses of acetylcholine produced a pressor effect. Dale stressed this dual action, pointing out that the effects of smaller doses which could be inhibited by atropine resembled those of muscarine, and that the effects of larger doses, following the inhibition by atropine of these muscarine-like actions, resembled those of nicotine. With the exception of the peripheral vasodilatation and the sweating, the muscarine-like effects imitated closely those produced by stimulation of the cranio-sacral or parasympathetic division of the autonomic nervous system.

Dale tried administration by subcutaneous injection. He found that a dose of 10 mg. had no effect, but that following 20 mg. in a smaller cat, weighing 2 kg., slowing of the heart, an increased flow of tears and of saliva, sweating, retching, borborygmi, and the exudation of slime from the anus, laboured respiration, erection of the penis, and the passage of urine occurred.

Further studies of the pharmacological effects of acetylcholine have confirmed these generalizations, and its actions in mammals under experimental conditions include constriction of the pupil (Lipschütz and Schilf, 1931), and, under certain conditions, a fall in intra-ocular pressure (Colle, Duke-Elder, and Duke-Elder, 1931), lacrimation, salivation, constriction of bronchioles, increased bronchial secretion (Schilf, 1932), increased depth and frequency of respirations (Gaddum, 1936), inhibition of the heart, increased tone and peristalsis of oesophagus, stomach, small intestine, and colon secretion of gastric juice (Gebhardt and Klein, 1933), contraction of the gall-bladder and relaxation of Oddi's sphincter (Kitakoji, 1931), increased secretion of pancreatic juice, contraction of the capsule of the spleen (Saad, 1935), contraction of the urinary bladder, feeble contraction of the uterus (Murakami, 1931), vasodilatation in organs supplied by the parasympathetic nervous system, generalized vasodilatation of the cutaneous arterioles, including those of the limbs and the surface of the brain (Wolff, 1929), and sweating. All these effects are inhibited by atropine. With larger doses, and unaffected by atropine, it has a pressor and cardio-accelerator effect through stimulation of the ganglia of the sympathetic nervous system and the adrenal glands, and it stimulates contraction of striped voluntary muscle fibres.

The effects following subcutaneous injection are uncertain and variable, and those following intravenous or

intra-arterial injection are remarkably evanescent owing to the rapid hydrolysis of acetylcholine by the choline esterase present in the blood and in the tissues. Physostigmine, by inhibiting this destruction by the esterase, can greatly increase and prolong all these effects.

Actions of Acetylcholine in Man

In 1916, at the suggestion of Sir Henry Dale and with the assistance of R. M. Wilson, I began studies on the action of acetylcholine chloride in man, but we were unable to complete them at that time owing to the requirements of military service. We found, however, that when given by subcutaneous injection there were no apparent effects, and that even when introduced intravenously no effect was obtained if blood from the vein was allowed to flow back into the syringe. These results were probably due to the rapid destruction of the acetylcholine by choline esterase.

Villaret and Justin-Besançon (1928) were the first to report the action of acetylcholine in man. They found that it had no action when given orally, and considered that it was dangerous when given intravenously. On subcutaneous injection in doses of 0.01 to 0.05 gramme no subjective phenomena occurred, but they were able to observe a dilatation of the retinal arteries. Larger doses—0.2 to 0.4 gramme—produced a sensation of warmth and sometimes a slight and transient fall in blood pressure and slight bradycardia. As noted by Hunt and Taveau (1906) and by Dale (1914) in animals, so it was noted by Villaret and Justin-Besançon in man that there was considerable variation in the intensity of effects in different subjects and at different times in the same subject. In view of the pronounced action of small intravenous doses in animals and the relatively large doses employed by Villaret, it is probable that only a trifling amount escaped destruction at the site of injection or in the blood stream and reached the organs of the body.

In 1932 Ellis and Weiss reported the effects in normal subjects of the administration of a 2 per cent. solution by intravenous and intra-arterial infusion. When given intravenously at the rate of 0.02 to 0.14 gramme per minute, flushing of the head and upper part of the body, throbbing in the head, palpitation, sweating, salivation, lacrimation, substernal constriction, nausea, and vomiting were observed. They found practically no effect on the heart rate, and only three out of thirteen subjects showed an appreciable fall in blood pressure. The intra-arterial infusion in four subjects produced flushing, sweating, heat, and increased arterial pulsation distal to the site of injection. In the same year Loeper, Lemaire, and Dany (1932) reported that they obtained contractions of the gall-bladder in dogs, and that, following the intravenous injection of 0.05 to 0.01 gramme in six human subjects, there was an increased flow of bile into the duodenum.

In 1933 E. A. Carmichael and I recorded the results of intravenous injection of acetylcholine in forty-six subjects. Doses of 0.01 to 0.03 gramme produced cardio-inhibitory effects, which appeared five to ten seconds after the injection and lasted for a few seconds only. The slowing of the heart was followed by a rise of rate above the original level; the systolic and the diastolic blood pressure fell during the phase of slow heart rate, but returned to their original level or a little higher during the phase of rapid heart rate. A feeling of warmth throughout the body, flushing of the face, neck, and upper thorax, coughing, and a sense of obstruction to respiration occurred, but they varied in incidence and intensity in different subjects. All these effects could be abolished by atropine and be intensified and prolonged by physostigmine. By intra-arterial injection we obtained flushing of the skin twenty seconds later in the area corresponding to the territory supplied by the artery, but we could observe no effect from subcutaneous or intramuscular injection in doses up to 0.5 gramme.

From these results and those obtained by Ellis and Weiss (1932) by continued infusion it appears that the muscarine-like effects noted in animals under experimental conditions can be obtained in man. There was, however, no evidence of the nicotine-like actions, and, although carefully looked for, no evidence of constriction of the pupil with the doses employed.

Of interest in relation to the nicotine-like effects on voluntary muscle in animals is the observation of Lanari (1936) that when 0.04 gramme of acetylcholine was given by intra-arterial injection there was no apparent effect on the muscles in normal subjects, but that slight contractions were seen in the muscles of the injected limb in cases of nerve section, strong contractions in pyramidal rigidity, moderate contractions in pyramidal lesions with flaccidity, and slight twitches only in extrapyramidal lesions and myopathies. He later (1937) described muscular contractions in cases of myotonia, with the same method of administration.

There seems to be no doubt that effects can be obtained by subcutaneous or intramuscular injection, but these methods of administration are unreliable. Villaret, Schiff-Wertheimer, and Justin-Besançon (1928) reported that they obtained in eleven of twenty-five subjects undoubted dilatation of the retinal arteries four to six minutes after the subcutaneous injection of 0.05 to 0.15 gramme. The effect lasted for six to nine minutes. Lemaire and Bioy (1934), following the subcutaneous injection of 0.2 gramme, observed a rise of pressure in the cerebrospinal fluid, due possibly to dilatation of the cerebral vessels. The rise lasted for fifteen to twenty minutes, but often failed to appear. This observation is of interest in connexion with the results obtained by Wolff (1929) in cats. He gave 0.02 to 0.2 mg. intravenously to four cats prepared by trephining so that the cerebral vessels could be observed through a window. Accompanying a fall in systemic blood pressure, an increase in the diameter of the pial vessels was observed and a rise in the pressure of the cerebrospinal fluid which he considered was due to the increased size of the cerebral vessels. Merklen, Warter, and Kabaker (1932) studied the effect on gastric secretion of the subcutaneous injection of 0.2 gramme, and considered that a rise in hydrochloric acid and total acidity resulted in subjects with normal or low acidity, but that there was a fall in subjects with high acidity. Faroy and Deron (1931), using similar doses by intramuscular injection, found no rise in the hydrochloric acid content in normal subjects, but in some cases a fall.

Acetylcholine in Therapeutics

In spite of its uncertainty when injected subcutaneously or intramuscularly, acetylcholine administered by these routes has been extensively employed for the purpose of obtaining either parasympathetic or vasodilator effects in patients. With the possible exception of its use by subconjunctival injection in spasm or embolism of the retinal arteries and in chronic glaucoma, the results have been unsatisfactory, either no effects being produced or there being so much uncertainty that other methods of obtaining them are preferable. It has usually been administered as

the chloride or bromide of acetylcholine, dissolved immediately before use, or stabilized in acid solution, as it decomposes rapidly in alkaline solution.

GASTRO-INTESTINAL

Abel (1933) gave 0.1 gramme by intramuscular injection hourly for six hours to fifty patients after laparotomy, starting thirty-six hours after operation until flatus or faeces were passed, and concluded that such treatment appears to be almost specific in curing paralytic ileus. Heritage (1933) reported good results in similar conditions, and Heitz (1929) extremely good results in lead colic. Gebhardt and Klein (1933) gave 0.1 gramme by subcutaneous injection to fifty patients with subacidity of gastric secretion or anacidity, in single doses or in series of twelve daily doses, and found an increase in acidity in a small number. He concluded that it had no true therapeutic value.

VASODILATOR

Numerous authors have found that in hypertension acetylcholine might cause a fall of blood pressure in doses of 0.1 to 0.2 gramme by subcutaneous or intramuscular injection, but that the effect was temporary and that it had no therapeutic value in this condition. In vasospastic conditions, arterial disease with pain or trophic lesions, such as Raynaud's syndrome, intermittent claudication, and trophic ulcers, and in varicose ulcers, several authors have reported that it caused a diminution of pain and early healing, but their papers are not convincing. Sciclounoff (1934) thought its employment deserved consideration in cerebral thrombosis, to hasten recovery; and de Gennes (1932), Pagniez, Plichet, and Decourt (1932), Louyot (1933), and McLaughlin (1933) were of the opinion that daily doses of 0.1 to 0.3 gramme by subcutaneous injection in epileptics lessened the severity or number of attacks. Janet, Vallery-Radot, and Huguet (1932) reported great improvement in two cases of acrodynia following five or six injections of 0.05 gramme at intervals of up to two days. Guns and Coene (1929) and Angelescu (1932) used it in ozaena, irrigating the nasal passages with a 5 or 10 per cent. solution after rendering the passages acid by previous washing with a 1 to 2 per cent. solution of lactic acid; they regarded the results as hopeful.

IN OPHTHALMOLOGY

A more promising field for acetylcholine in therapeutics is in the treatment of congestive glaucoma and in spastic or obstructive conditions of the retinal vessels. If given by subconjunctival injection a local effect—miosis and lowering of intra-ocular tension—is obtained in chronic glaucoma, and Villaret and his co-workers have stressed the vasodilatation of the retinal vessels that follows subcutaneous or intramuscular injection. Velhagen (1932) showed in cats that acetylcholine is present in the uveal tract and the retina, and that in glaucoma it constricts the pupil, dilates the retinal vessels, and lowers the tension. Gallois (1930) reported that, following six injections of 0.1 gramme in a case of chronic glaucoma progressing unfavourably, there was an improvement in the field of vision and a fall in tension. In this country Evans and Evans (1934) treated six cases of congestive glaucoma by means of subconjunctival and intramuscular injections and recorded a fall of intra-ocular tension without change in the systemic blood pressure. The chief defect in this method of treatment, they point out, is the evanescence of the action. Dejean (1932) recommended the use of 0.1 gramme by subcutaneous injection in ophthalmic migraine, and de Saint-Martin (1931) considered that similar doses gave relief in various spastic conditions of the retinal arteries. Villard, Dejean, and Temple (1932) obtained a prompt return of vision in one of three cases of thrombosis of the central artery of the retina. Hartmann (1933) gave repeated intramuscular injections of 0.1 gramme in various arterial lesions with visual defects, obtaining favourable results; and Orr and Young (1935) by subconjunctival injections obtained a rapid return of vision in a case of embolism of the central artery of the retina, and the embolus was observed to move towards the periphery. Duggan (1937a) treated two cases of acute retrobulbar neuritis with repeated doses of 0.1 gramme intramuscularly, and considered that the vision returned more rapidly than in eight similar cases treated with amyl nitrite or intravenous injections of sodium nitrite. Hartmann (1933) believed acetylcholine to be the best therapeutic agent in tobacco amblyopia when given by the intramuscular route, Orr (1936) reported good results from the same method, and Cragg (1936) considered that it hastened recovery, but Duggan (1937b), who used intravenous injections, found it of doubtful value.

These results of the administration of acetylcholine to man by intra-arterial, intravenous, intramuscular, or subcutaneous injection, whether in normal subjects or in patients, are disappointing from the therapeutic point of view. When it is given by intravenous injection the effects are too brief, when given by intramuscular or subcutaneous injection too uncertain. They are, however, of importance as indicating the nature of the actions that can be obtained and pointing to possible therapeutic uses of the principle of acetylcholine transmission if more stable substances with the same or similar actions should be available. A number of other esters of choline and its derivatives were studied by Hunt and Taveau and by Dale, and since the publication of their researches many more have been prepared and tested. Of these only two have come into general use for therapeutic purposes—carbaminoyl-choline and acetyl-β-methyl-choline—and their actions and therapeutic uses will be discussed in the next lecture.

REFERENCES

Abel, A. L. (1933). *Lancet*, **2**, 1247.
Alles, G. A. (1934). *Physiol. Rev.*, **14**, 276.
Angelescu, G. (1932). *Ann. Oto-laryng.*, p. 669.
Bacq, Z. M. (1935). *Ergebn. Physiol.*, **37**, 82.
Brown, G. L. (1937). *Physiol. Rev.*, **17**, 485.
Brücke, F. T. von (1937). *J. Physiol.*, **89**, 429.
Cannon, W. B., and Rosenblueth, A. (1937). *Autonomic Neuro-Effector Systems*, New York.
Carmichael, A. E., and Fraser, F. R. (1933). *Heart*, **16**, 263.
Colle, J., Duke-Elder, P. M., and Duke-Elder, W. S. (1931). *J. Physiol.*, **71**, 1.
Cragg, B. H. (1936). *Bristol med.-chir. J.*, **53**, 237.
Dale, H. H. (1914). *J. Pharmacol.*, **6**, 147.
—— (1933). *J. Physiol.*, **80**, 10 (Proc.).
—— (1934). *British Medical Journal*, **1**, 835.
—— (1935). *Sammlung der Nothnagel-Stiftung*, Heft **4**, Berlin and Vienna.
—— (1937). *Harvey Lectures*, **32**, 229, New York.
—— and Gaddum, J. H. (1930). *J. Physiol.*, **70**, 109.
de Gennes, L. (1932). *Bull. Mém. Soc. méd. Hôp. Paris*, **48**, 394.
Dejean, C. (1932). *Presse méd.*, **40**, 1950.
de Saint-Martin (1931). *Ann. Oculist.*, **168**, 102.
Duggan, W. F. (1937a). *Arch. Ophthal.*, Chicago, **17**, 579.
—— (1937b). *J. Amer. med. Ass.*, **109**, 1354.
Ellis, L. B., and Weiss, S. (1932). *J. Pharmacol.*, **44**, 235.
Engelhart, E., and Loewi, O. (1930). *Arch. exp. Path. Pharmak.*, **150**, 1.
Evans, J. J., and Evans, P. J. (1934). *Trans. ophthal. Soc.*, **54**, 527.
Faroy, G., and Deron, R. (1931). *Arch. Mal. Appar. dig.*, **21**, 777.
Gaddum, J. H. (1936). *Gefasserweiternde Stoffe der Gewebe*, Leipzig.
Galehr, O., and Plattner, F. (1927). *Pflüg. Arch. ges. Physiol.*, **218**, 488.
Gallois, J. (1930). *Bull. Soc. Ophtal. Paris*, p. 811.
Gebhardt, F., and Klein, J. (1933). *Klin. Wschr.*, **12**, 535.

Guns, P., and Coene, R. (1929). *Ann. Malad. Oreille*, **48**, 414.
Hartmann, E. (1933). *Bull. Soc. ophtal. Paris*, p. 414.
Heitz, J. (1929). *Arch. Mal. Cœur*, **22**, 383.
Heritage, K. (1933). *Lancet*, **2**, 1258.
Hunt, R., and Taveau, R. de M. (1906). *British Medical Journal*, **2**, 1788.
Janet, H., Vallery-Radot, P., and Huguet, S. (1932). *Bull. Soc. Pédiat. Paris*, **30**, 644.
Jones, M. S., and Todd, H. (1935). *Biochem. J.*, **29**, 2242.
Kitakoji, Y. (1931). Quoted in *Ber. ges. Physiol.*, **63**, 58.
Lanari, A. (1936). *C. R. Soc. Biol.*, Paris, **123**, 1090.
—— (1937). Ibid., **125**, 546.
Langley, J. N., and Anderson, H. K. (1904). *J. Physiol.*, **30**, 439; **31**, 365.
Lemaire, A., and Bioy, E. (1934). *Progr. méd.*, Paris, p. 1871.
Lipschütz, H., and Schilf, E. (1931). *Arch. exp. Path. Pharmak.*, **162**, 617.
Loeper, M., Lemaire, A., and Dany (1932). *Bull. Mém. Soc. méd. Hôp. Paris*, **48**, 943.
Loewi, O. (1921). *Pflüg. Arch. ges. Physiol.*, **189**, 239.
—— (1922). Ibid., **193**, 201.
—— (1933). *Harvey Lectures*, p. 218, New York.
—— and Navratil, E. (1924). *Pflüg. Arch. ges. Physiol.*, **206**, 123.
—— —— (1926). Ibid., **214**, 678.
Louyot, P. (1933). *Rev. méd. Est*, **61**, 258.
Lucas, C. C., Hall, G. E., and Ettinger, G. H. (1935). *J. Pharmacol.*, **54**, 151.
McGeorge, M. (1937). *Lancet*, **1**, 69.
McLaughlin, F. L. (1933). *British Medical Journal*, **1**, 997.
Mann, P. J. G., Tennenbaum, M., and Quastel, J. H. (1938). *Biochem. J.*, **32**, 243.
Matthes, K. (1930). *J. Physiol.*, **70**, 338.
Merklen, P., Warter, J., and Kabaker, J. (1932). *C. R. Soc. Biol.*, Paris, **111**, 213.
Murakami, K. (1931). Quoted in *Ber. ges. Physiol.*, **61**, 58.
Orr, H. C. (1936). *British Medical Journal*, **2**, 69.
—— and Young, J. H. (1935). Ibid., **1**, 1119.
Pagniez, P., Plichet, A., and Decourt, P. (1932). *J. Méd. Paris*, **52**, 872.
Plattner, F., and Hintner, H. (1930). *Pflüg. Arch. ges. Physiol.*, **225**, 19.
Saad, K. (1935). *Quart. J. Pharmacy*, **8**, 31.
Schilf, E. (1932). *Arch. exp. Path. Pharmak.*, **166**, 22.
Sciclounoff, F. (1934). *Presse méd.*, **42**, 1140.
Stedman, Edgar, Stedman, Ellen, and Easson, L. H. (1932). *Biochem. J.*, **26**, 2056.
Velhagen, K. (1932). *Arch. Augenheilk.*, **105**, 573.
Verebély, T. von (1936). *Klin. Wschr.*, **15**, 11.
Villard, H., Dejean, C., and Temple, J. (1932). *Arch. Ophtal.*, **49**, 72.
Villaret, M., and Justin-Besançon, L. (1928). *Presse méd.*, **36**, 673.
—— Schiff-Wertheimer, and Justin-Besançon, L. (1928). *C. R. Soc. Biol.*, Paris, **98**, 909.
Wolff, H. G. (1929). *Arch. Neurol. Psychiat.*, Chicago, **22**, 686.

In the Chemistry Section at the Cambridge Meeting of the British Association, August 17–28, the president, Professor C. S. Gibson, will review the recent advances that have been made, chiefly by himself and his co-workers, in the chemistry of gold. This opening address will be followed by a discussion on recent advances in the organic chemistry of the metals with special reference to the noble metals. A discussion on modern methods of chemical analysis, including physical and microchemical methods, will be opened by Dr. J. J. Fox, Chief Government Chemist, and Professor W. L. Bragg will open a discussion on "Clays." The fourth symposium, entitled "Repercussions of Synthetic Organic Chemistry on Biology and Medicine," which has an added interest in view of the exceptional circumstance that the Physiological Section will not meet this year, is being arranged by Professors E. C. Dodds and J. W. Cook. Recent work on the production of new compounds having the biological action of the sex hormones will be described by Professor Dodds and Professor L. Ruzicka (Zürich), and Dr. A. S. Parkes will deal with some of their interesting biological interrelationships. The second half of the programme will be occupied with descriptions of synthetic compounds which are able to induce cancer (Professor J. W. Cook), of new compounds having the physiological action of the life-maintenance hormone of the adrenal cortex (Professor T. Reichstein, Zürich), and of the synthesis of vitamin B_1 and analogous compounds (Dr. A. R. Todd). Specimens and apparatus relating to these discussions will be on exhibition throughout the meeting. By invitation of Sir William Pope a visit will be made to the University Chemical Laboratories, and Sir F. Gowland Hopkins has invited the section to visit the departments of biochemistry and biology, and the Molteno Institute.

SURGICAL TREATMENT OF DISSEMINATED SCLEROSIS BY SYMPATHECTOMY AND GANGLIONECTOMY

TECHNIQUE BY THE ANTERIOR APPROACH

BY

C. F. KOCH, M.D.,

(From the Surgical Division of the City Hospital of Middelburg)

AND

EUGENE DE SAVITSCH, A.B., M.D.,

C.R.B. Fellow and Associé Étranger à l'Institut Bunge, Antwerp

Nothing is more discouraging to the neurologist than the treatment of disseminated sclerosis. The task is made difficult on account of ignorance of the true aetiology of the disease. The correct evaluation of any therapeutic measure is complicated by the irregularity of the symptoms of the disease, with its frequent spontaneous remissions and uncertainty of objective findings. Among the various theories of the aetiology of disseminated sclerosis the vascular hypothesis appears to be the most logical. Putnam (1933, 1931–6, 1937), in his admirable studies, has shown that the histological characteristics of the disease may be closely imitated experimentally by a number of different procedures, all of which have in common an interference with the blood supply of the affected area. These facts, according to this author, give a new importance to the vascular abnormalities which have long been recognized as a characteristic of sclerotic plaques. Putnam further states that if the specific lesion is produced by a simple mechanical interference with the blood supply it is superfluous to postulate a specific demyelinizing organism, virus, or toxin to account for such lesions, and that the ultimate aetiological factor should probably be sought in a local vascular abnormality.

The Vascular Hypothesis

Our procedure is based on the assumption that the hypothesis of Putnam is probably correct. In this we are in agreement with Wetherell (1934, 1935) and Royle (1933), who were able to show the practical application of this theory. We consider that the pathological changes in disseminated sclerosis are attributable to an ischaemic phenomenon resulting possibly from a spasm of the blood vessel supplying the parenchyma of the brain and spinal cord. Our aim, therefore, is to institute a procedure which would tend to lessen the alleged vascular contraction, thus allowing a better blood supply to the involved areas. There is but little doubt that this procedure can in no way remedy the complete damage to the nerve cells and their axons, but it is quite conceivable that the improved vascularization may re-establish some of the functions of partially damaged tissue. That this is possible is best demonstrated by the course of the disease itself. Frequent remissions and sometimes total disappearance of symptoms lead us to believe that in many cases the destruction of the nerve cells is in no sense final, and that when they are placed in more advantageous conditions their function may be regained.

The theoretical aspects of this procedure may be summarized as follows. Vascularization of the brain and the spinal cord depends entirely on the carotids and vertebral arteries. These are innervated by the sympathetic nervous

system through the stellate ganglion and the vertebral nerve. Fig. 1 shows in a schematic way the structural relations concerned. As may be seen, should a vascular spasm be present, it would find its responsible nervous factor in either the stellate ganglion or the vertebral nerve, or in both.

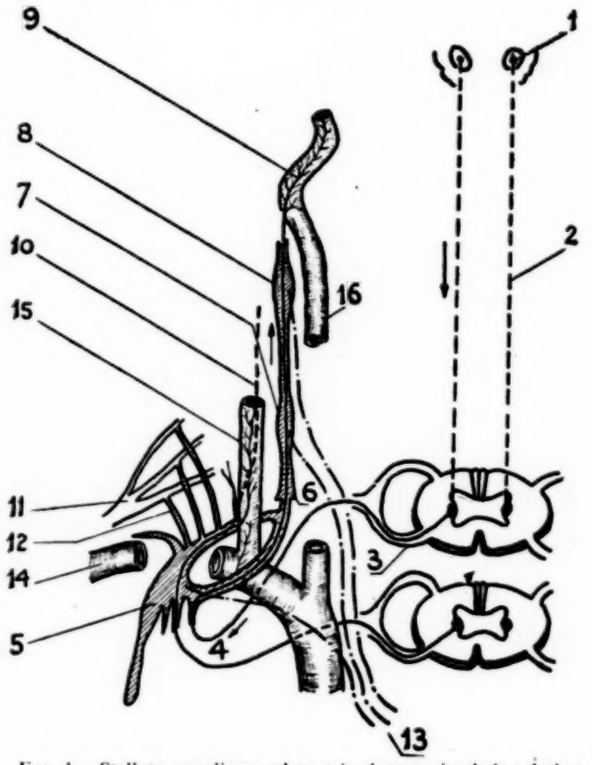


FIG. 1.—Stellate ganglion and vertebral nerve in their relation to the carotid and vertebral arteries (schematic figure). 1, Hypothalamus with vasomotor centre. 2, Intramedullary vasomotor tract. 3, Radix medulla anterior. 4, Ramus communicans albus. 5, Stellate ganglion. 6, Ganglion intermedius. 7, Ganglion cervicale med. 8, Superior cervical ganglion. 9, Carotid plexus. 10, Vertebral nerve. 11, Brachial plexus. 12, Ramus communicans griseus. 13, Nervi cardiaci symp. 14, Subclavian artery. 15, Vertebral artery.

Operative Procedure

The extirpation of the upper thoracic and lumbar sympathetic ganglion and trunks by the dorsal approach was carried out successfully by Adson and Brown (1929) in the treatment of Raynaud's disease. The sympathetic ganglionectomy by the anterior approach by the same authors failed to give the desired results. On the other hand German (Rieder, 1930) and French (Leriche, see Cadenat, 1933) investigators successfully used the latero-anterior route. The dorsal approach necessitates extensive dissection as well as actual costo-transversectomy, which is likely to be accompanied by a considerable shock to the patient, as in most of the bone operations. The approach of Leriche and Rieder, though definitely less traumatizing, has the disadvantage of limiting the visibility of the operative field. The technique which we propose is an attempt to eliminate the drawbacks of the earlier trials. Our experience is based on some twenty-six operations, most of them in cases of advanced disseminated sclerosis.

PRE-OPERATIVE ROUTINE

The pre-operative preparation of the patient is essentially the same as in any other surgical procedure. A soap-and-water enema and a mild sedative of the barbiturate group on the eve of the operation ensure a restful night to the patient. For pre-operative medication a dilaudin-atropine combination gives excellent results. We feel that avertin by rectum in doses of 70 to 105 mg. per kilo of body weight, depending on the condition and age of the patient, is the anaesthetic of choice. It has the advantage of permitting the anaesthesia to be induced while the patient is still in his room, and its lasting effect helps greatly in alleviating post-operative apprehension. Avertin alone is practically never sufficient. It has to be supplemented by local infiltration of 1/2 per cent. of novocain solution with 16 drops of 1 in 1,000 solution of epinephrine per 100 c.cm. of novocain. In certain cases a few whiffs of ether have to be given in the terminal stages. It is well to have on hand a positive-pressure anaesthesia apparatus, as occasionally the pleura may be punctured during the course of the operation.

An ordinary thyroidectomy set may suffice, but a few specially devised instruments, as illustrated in Fig. 2, are of

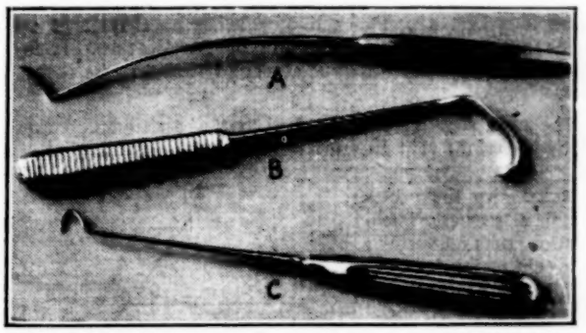


FIG. 2.—Special instruments. A, Depressor. B, Retractor. C, Aneurysm needle.

considerable help. The depressor A has the advantage of a long handle and curved spoon-like spatula which allow the retraction of the moving dome of the pleura during deeper dissection. For retraction of larger vessels the retractor B ensures a considerable amount of visibility with comparatively great safety. A small aneurysm needle (C) for ligation of smaller vessels is optional.

Careful haemostasis and exact knowledge of the anatomical relations of this region are indispensable in this procedure. Even the slightest haemorrhage obscures the operative field, causing a very prolonged and distressing delay. In cases of doubt as to the nature of the structure it is always best to ligate it, this precaution saving a great deal of time in the long run. The anatomy of the region, though fairly uniform, is none the less subject to numerous modifications. The variable calibre and the relative positions of the blood vessels are particularly annoying. The vertebral nerve is a great offender. Its position in reference to the vertebral vessels classically (Hovelacque *et al.*, 1937) is said to be posterior to the vertebral arteries. In some of our cases the relationship was just the reverse. We emphasize this point in order to place the operator on guard against the unexpected possibility.

SOME DETAILS OF TECHNIQUE

After induction of the avertin anaesthesia the patient is placed in a semi-reclining position with the neck hyperextended and the head turned away from the side on which the operation is to be performed. It is essential to see that the patient is so securely fixed as not to permit any change of position during the operation. After the infiltration of the skin with local anaesthetic a semilunar incision is made just above the clavicle extending from the border of the trapezius to approximately one centimetre beyond the midline. (In the first attempt (Koch, 1937) a vertical incision was made parallel to the sternocleidomastoid muscle; it proved to be somewhat unsatisfactory as it permitted but limited exposure of the caudal end of the sympathetic trunk.) The skin and adjoining platysma are separated from adjacent tissues and the cut edges are fastened with silk sutures so as to allow the maximum of gaping. The next step is a division of the clavicular portion of the sternocleidomastoid muscle. Its cranial portion is lifted and sutured to the already fastened upper edge of the skin. This procedure brings into view the

omohyoid muscle, the fascia colli media, fat, and possibly some lymph nodes. The omohyoid muscle is transfixed by two sutures and divided, the sutures preventing either portion from getting lost. The removal or pushing away of the fascia colli media and adjoining fat and the division of the omohyoid muscle expose the scalenus anterior muscle with the phrenic nerve, the inferior thyroid artery, the ascending cervical artery, and the transverse cervical artery. After gentle blunt dissection the thyreo-cervical trunk is brought into view. In some instances, in order to get into the deeper structure, it is not necessary to ligate the entire trunk; the ligation of the inferior thyroid artery suffices. The decision depends on the ease with which it is possible to retract caudally the subclavian artery. Without retracting the subclavian artery it is difficult to reach the vertebral artery with the accompanying sympathetic plexus.

Should it be necessary to ligate and cut the thyreo-cervical trunk it is best accomplished by leaving a fairly large stump so as not to permit the slipping of the ligature. It is felt that it is always safer to put a second ligature just below the first.

The next step is to proceed with the division and ligation of the vertebral vein crossing obliquely from the medial aspect of the scalenus anterior into the prevertebral tissues. The ligation of the vertebral vein clearly brings into view the anterior aspect of the vertebral artery and medially to it the ganglion intermedius. This relation is not constant; occasionally the ganglion may be found laterally or anterior to the artery. A nerve twig from the sympathetic trunk to the stellate ganglion, the Ansa Vieusseni, is seen going over the subclavian artery. It may be easily identified by applying traction, which moves the subclavian artery. Using the Ansa Vieusseni as the lead, the sympathetic chain is reached. Once the relationship is established the vertebral artery is stripped of its sympathetic plexus over an area of about one to two centimetres. The dissection is rendered fairly simple by use of a small sharp scalpel. When stripped the artery is pulled up and the underlying tissue examined. After lateral retraction of the scalenus anterior muscle the prevertebral fascia is divided. The stellate ganglion with its numerous branching fibres and occasional veins is then in plain sight. Careless cutting of a vessel in this region results in a brisk and obscuring bleeding. In carrying out the dissection the surgeon's action may be aided greatly by the introduction of the small spoon-like depressor A. The movement of the pleural dome on which is superimposed the costo-cervical artery not only interferes with the visualization of the field but also may lead to an accidental perforation of the parietal pleura. It is self-evident that the dome must be detached from its costal and cervical attachments; this is best accomplished with the aid of a sharp thin scalpel. The costo-cervical artery should always be divided and ligated. The extirpation of the stellate ganglion and of the vertebral nerve is accomplished in one step. The ganglion is grasped firmly by the Thiersch forceps and pulled anteriorly. The rami and the attachments are thus brought into light and may be cut from their upper end with sharp scissors. Once freed from the upper and posterior attachments more forward traction is applied to the ganglion so as to permit the introduction of a finger between the sympathetic trunk and the posterior wall. With the finger as a guide the trunk is detached as far as possible and cut below the first costo-vertebral junction, which is roughly midway between the stellate and second thoracic ganglia. If the operation is done with care, the field is dry and therefore closure may be accomplished without any drainage. If in doubt, a drain may be placed in the dependent portion of the wound. After the repair of the separated muscles the wound is closed in layers in the usual fashion. The patient is kept in bed for a period of about one week, and the other side may be operated on in approximately two weeks.

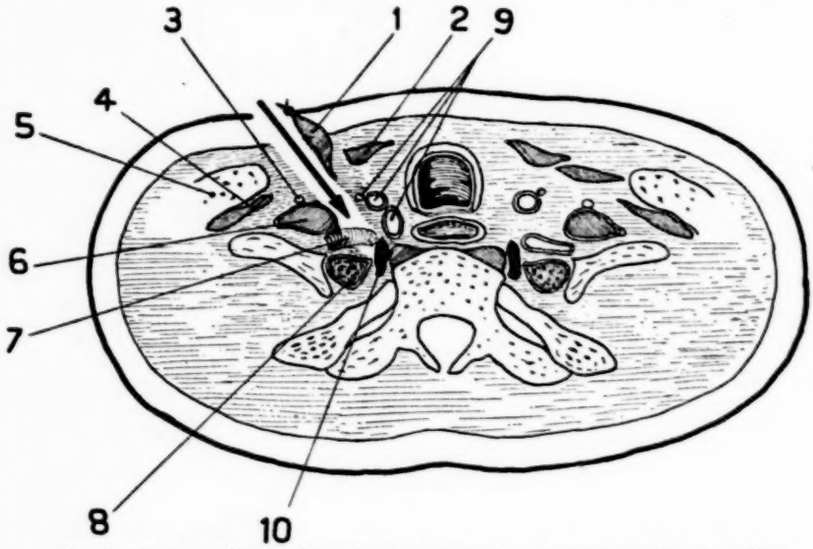


FIG. 3.—Cross-section of the neck showing the anterior approach to the stellate ganglion. 1. Sternocleidomastoid muscle (sutured end). 2. Sternocleidomastoid muscle (inferior portion). 3. Phrenic nerve. 4. Omohyoid muscle. 5. Clavicle. 6. Scalenus anterior muscle. 7. Subclavian artery. 8. Lung. 9. Vagus, carotid artery, and internal jugular vein. 10. Stellate ganglion.

Complications and Sequels

In the series of patients operated on by this method two fatalities have been observed. One was due to embolism, and the other patient died several hours after the operation of a brisk haemorrhage due to the slipping of the ligature from the thyreo-cervical trunk.

The anticipated Horner's syndrome was observed in every case, though enophthalmos had a tendency to regress, becoming quite inconspicuous within a few months. The physiological complication to be expected is the inability of the heart to respond with acceleration to any muscular effort (the cardiac nerve is severed from its attachment when the stellate ganglion is removed). For about two months following the operation the patient must avoid any extreme exertion, as it may be accompanied by weakness and even collapse. Shortly after the operation some patients complain of pains in the shoulder and arm on the side of the operation. The pain lasts but a few days, and usually requires no attention. In certain persistent cases it was found useful to inject a small amount of novocain into the brachial plexus right above the clavicle; this gave immediate and permanent relief. Another complication seen in about one-third of the cases is incontinence. Fortunately it is not lasting, and in our experience always disappeared after the first forty-eight hours. Occasionally there is a paresis of the upper extremity of the operated side lasting but a few days and leaving no residual effects. Two patients perspired copiously in the region of the abdomen, lower back, and lower extremities. So intense was the perspiration that it necessitated special nursing care. This lasted for a period of almost six weeks, and responded but poorly to atropine.

Results

The operation was performed on fifteen cases of disseminated sclerosis, of which ten may be considered for statistical study, six to fourteen months having elapsed

since the operation. Eight of the ten patients are alive to-day.

Practically every case, including the four most recent ones, responded favourably to this surgical procedure, which is in agreement with the findings of Wetherell. At no time did we notice any immediate unfavourable effects in the development of symptoms. We attach considerable importance to this, since trauma in cases of disseminated sclerosis is believed to cause aggravation of symptoms.

It would be premature to draw final conclusions regarding the ultimate possibilities of this treatment. None the less we feel encouraged because in the majority of cases a remarkable degree of amelioration has taken place. It is not possible to attribute all the improvement to spontaneous changes in the course of the disease. All of the patients were in an advanced stage of the disease. We are attempting now to operate on patients in earlier stages, when, of course, the evaluation of results will be considerably more difficult and not easily assessed.

This report attempts to deal primarily with the technique of the operation, and so no detailed account will be given of every case. We feel that it is desirable to present the history of one of the patients in detail in order to give an idea of the type of case we have treated. Since the procedure is in the experimental stage we have so far applied it only to cases which respond to no other method of treatment. The case below is typical of this group.

Case History

A man 39 years old presented himself for an operation at the Middelburg Hospital in June, 1936, with the following story.

After an accident in 1926, when his right thigh was run over by a carriage, he developed a paraesthesia of the injured side. The Wassermann and Kahn reactions were negative, but there was a slightly positive Pandy test. Shortly after the first examination the patient developed some difficulty in walking. There was a slight tremor of the lower right extremity, but there was neither nystagmus nor intention tremor. The speech was normal. The patient was given an arsenic and quinine preparation and asked to report for examination later.

An examination at the beginning of 1927 disclosed general aggravation of the symptoms. Paraesthesia became more pronounced and involved both of the lower extremities. Three years later, in addition to the original complaints, he developed pains in the right side, and there was a marked decrease in the muscular power of the right leg. The patient began to have difficulties with his vision, and was frequently nauseated. Some six months later Romberg's sign became definitely positive, rotary bilateral nystagmus was noted, and there was a bilateral Babinski reflex. The patient was unable to move, and most of his time had to be spent in bed. Examination in the middle of 1930 showed that the right Babinski reflex had disappeared, but the nystagmus persisted. The patient developed spontaneous jerking of the lower extremities, and there was pallor of both retinae. The patient was no longer able to read. There was a marked ataxia of the lower extremities, and some retention of urine. In 1934, in addition to the aggravation of the symptoms present, pains appeared in the lower limbs. The right leg could no longer support him.

In 1936, examination on the eve of operation revealed the following salient features: diplopia, marked bilateral nystagmus, temporal pallor of both optic disks, inability to read, scanning speech, bilateral intention tremor of the upper extremities, abolition of abdominal reflexes; most of the time the patient had to depend on a catheter for the passage of urine, both knee-jerks were absent, both plantar reflexes were extensor, both lower extremities showed occasional spon-

TABLE A

Case No.	Age of the Patient in Years	Duration in Years of the Disease from the First Observed Symptom	Number of Remissions	Duration of the Final Stage Before Operation
1	39	10	3	± 4 years
2	46	16	No remissions	± 2 „
3	38	5	4	± 1 year
4	45	17	No remissions	± 2 years
5	41	13	„	± 2 „
6	38	15	5	± 1 year
7	40	15	3	± 1 „
8	31	7	1	± 1½ years
9	31	1	No remissions	9 months
10	25	1½	1	8 „
11	32	15	No remissions	2½ years
12	42	17	1	4 „
13	32	5	?	1 year
14	46	9	No remissions	6 months
15	28	8	„	3 years

TABLE B

Signs and Symptoms	Case No. 3		Case No. 4		Case No. 6		Case No. 7		Case No. 8		Case No. 9		Case No. 11		Case No. 13		Case No. 14		Case No. 15	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
1. Fatigue and Weakness	xxxx	x	xxxx	x	xxx	xx	xx	xx	xxx	x	xxx	o	xx	o	xx	x	xx	o	x	x
2. Stiffness of Extremities	xx	o	xxxx	x	xxx	xx	xxx	xx	xx	x	x	o	x	/	xx	x	xx	x	xxx	xx
3. Ataxia of Extremities	xx	x	xxx	xx	xx	xx	xxxx	xxx	xx	x	xxx	xx	xx	x	xx	xx	xxx	xxx	xxx	xxx
4. Eyes: Nystagmus	o	o	o	o	o	o	x	x	xx	xxx	x	o	x	x	x	o	o	o	x	x
5. Diplopia	o	o	o	o	o	o	x	o	/	/	o	o	x	x	o	o	x	o	o	o
6. Scanning Speech	o	o	o	o	o	o	xx	x	xxxx	x	x	o	o	/	xx	o	o	o	o	o
7. Pain	o	o	xx	o	x	o	xxxx	o	x	x	x	o	o	o	o	o	x	x	o	o
8. Intention Tremor	o	o	xx	o	xxx	x	xxxx	xx	xxxx	x	xxxx	x	x	x	x	x	o	o	xx	xx
9. Clonus	xx	o	xx	o	o	o	/	/	x	x	x	x	x	x	x	x	o	o	x	o
10. Bladder Disturbance (R – Retention; I – Incontinent)	R.x	o	o	o	x	x	I.xxx	I.x	I.xxxx	I.x	R.x	o	o	o	R.xx	o	x	o	I.x	I.x
Time (in months) elapsed since operation	14		13		13		12		10		10		10		5		3		1	

Explanatory Note: Intensity of symptoms are recorded as follows: x – minimum; xxxx – maximum; / – doubtful; o – absence; A – Before operation; B – After operation.

taneous jerks, and there was a marked ankle clonus. The patient could not walk independently, and was able to move about only with the support of two sticks; at best, the furthest he could progress by himself did not exceed ten metres, and even then he occasionally had to be supported. When moving, the body was bent forward with the two arms stretched forward clutching the two walking sticks in front.

An operation was performed on the left side on June 25, 1936. On the first day after the operation he was unable to move his left leg, and incontinence was absolute. On the second day the spontaneous jerks in the left leg disappeared, though they were still present in the right leg. On the third day the patient was able to move his left leg. There was no change in the other symptoms.

The sympathectomy and ganglionectomy were performed on the right side eleven days after the first operation. On the following day the patient was no longer incontinent. The spontaneous jerks of the right leg were only slightly perceptible. Three days later they disappeared altogether. Paraesthesia of the extremities was no longer present. Two weeks later the patient tried to walk supported by a stick and a nurse. Twenty-four hours after the first attempt he was able to move about with a walking stick. For the first time in several months he was able to lift his legs independently. In about three weeks after the second operation the patient was able to walk without the help of the stick or nurse. The walking, though fairly strenuous, was successful, although the gait was shuffling. Romberg's sign was negative. There was no ataxia. On the twenty-third day the patient was discharged from the hospital. He returned for examination a month later. He moved about independently with apparent ease, though he collapsed some six weeks after the operation following a walk of a few hundred metres. The examining physician stated that the pulse frequency was normal. The collapse necessitated a rest of a few hours, after which the patient felt normal. Three months later he was able to resume his former occupation as an assistant in a grocery shop. He was able to walk about, though he preferred to be supported by a walking stick.

Fourteen months later the patient is still able to walk with the aid of a stick. There is no diplopia. He is able to read. Romberg's sign is negative, and he has no pain.

Conclusion

The case of multiple sclerosis just described was one with a definite downward course. The only transient improvement was in 1930, when the patient temporarily lost his right Babinski reflex. The operation has not only arrested the progress of the symptoms but has also re-established some of the functions.

We are presenting all our cases in tabulated form. Table A gives age of the patient, duration of the disease from the first observed symptom, number of remissions, duration of the final stage before operation; Table B gives the outline of principal symptoms and their changes. Space will not permit detailed consideration of each case. We have confined ourselves to the most distressing symptoms and to those common to most of the cases. Neither will the record of reflexes be given, since the surgical procedure only exceptionally modified the original findings.

The evaluation of the results in Cases 1, 2, 5, 10, and 12 is not included. No. 1 has already been discussed in detail. No. 2, because of a very unsatisfactory physical condition, could be operated only on one side, and died of uraemia eight months subsequently. Patients Nos. 5 and 12 died, one of pulmonary embolism and the other of a haemorrhage of the thyreo-cervical trunk. Patient No. 10, though showing progressive improvement in neurological symptoms, died of intercurrent infection eight months later.

This paper deals primarily with the technique of ganglionectomy and sympathectomy by the anterior approach. Our experience with this treatment in advanced multiple sclerosis suggests the desirability of further trial of this therapeutic measure.

REFERENCES

Adson, A. W., and Brown, G. E. (1929). *Surg. Gynec. Obstet.*, **48**, 577.
Cadenat, F. M. (1933). *Presse méd.*, **41**, 1014.
Delmas, J., and Laux, G. (1933). *Anatomie médico-chirurgicale du système nerveux végétatif*, Masson et Cie.
Hovelacque, Monod, and Evrard (1937). *Le Thorax: Anatomie médico-chirurgicale*, Paris.
Koch, C. F. (1936). *Cong. franç. Chir.*, Paris, **45**, 451.
—— (1937). *Nederl. Tijdschr. Geneesk.*, **81**, 425.
Putnam, T. J. (1933). *New. Engl. J. Med.*, **209**, 786.
—— (1931–6). Studies in Multiple Sclerosis, I–VII *Arch. Neurol. Psychiat.*, Chicago.
—— (1937). Ibid., **37**, 1298.
Rieder, W. (1930). *Arch. klin. Chir.*, **158**, 355.
Royle, N. D. (1933). *Med. J. Austral.*, **1**, 586.
Wetherell, F. S. (1934). *J. Amer. med. Ass.*, **102**, 1754.
—— (1935). *Arch. Neurol. Psychiat.*, Chicago, **34**, 99.

THE TREATMENT OF PLACENTA PRAEVIA

A REVIEW OF 286 CASES

BY

O. LLOYD, M.B., B.S.

AND

J. E. GIESEN, M.B., B.S.

Late Resident Medical Officers, Queen Charlotte's Maternity Hospital, London

During our respective terms of office at Queen Charlotte's Maternity Hospital we were much impressed by the results of a scheme in operation for the treatment of placenta praevia. The principle of this scheme was that all cases should be treated by a preconceived routine method. We found that its use greatly facilitated our work and, so far as we could judge, led to an improvement in the mortality rate of this grave condition.

A Standardized Method

Standardization is obviously a desirable feature in dealing with certain emergencies, as it affords an opportunity of assessing the value of the treatment, and those who have to carry this out are "forearmed" with a knowledge of the immediate steps to be taken for the relief of the disaster. It would seem of value to publish the results of a standardized treatment of a condition for which such a variety of methods are advocated. Since this scheme was put into operation 143 cases of placenta praevia have been treated over a period of approximately five years. These cases we shall refer to as Group A. For purposes of comparison we have taken an equal number of cases immediately preceding the start of the scheme. This series of 143 cases will be referred to as Group B. The principles governing the treatment of cases in Group A were laid down by Mr. Leonard Phillips, who assumed responsibility for all cases of placenta praevia. He has kindly allowed us to publish an account of his routine treatment. In order to clarify this account the following definitions are given:

1. A central placenta praevia was considered to be present if the internal os was completely covered by placental tissue

at the time of examination per vaginam, the examination being made under anaesthesia and the finger passed round the whole internal os.

2. A marginal position of the placenta was held to exist if the edge of the placenta partly covered the internal os and the presenting part could be felt covered by membranes on the other side of the internal os.

3. A lateral position of the placenta was considered to be present if the edge of the placenta could only be felt with difficulty in the lower segment by the examining finger and the placenta did not encroach upon the internal os.

Principles and Practical Aspects of the Treatment

The following account enumerates the principles and summarizes the practical aspects of the treatment.

1. In all cases of ante-partum haemorrhage a routine clinical examination was made in order to exclude toxaemia. If this was negative the cases were then regarded as instances of low insertion of the placenta until vaginal examination had excluded this complication.

2. The blood group of all patients with a pulse rate of 100 per minute or over was determined prior to vaginal examination and preparations were made for transfusion.

3. Vaginal examination was performed under light general anaesthesia with the patient in the lithotomy position, such examination being performed only after full preparations had been made for packing the vagina. The examination was made very carefully, the state of the cervix being noted, and the lower uterine segments gently explored with the examining finger. Subsequent procedure varied according to the findings. If a central placenta praevia was diagnosed Caesarean section was the routine method of delivery, and if bleeding occurred at the examination the vagina and cervical canal were packed with gauze until it was effectively controlled by direct pressure. Counter-pressure was effected by a tight abdominal binder and a T-shaped perineo-abdominal bandage. The condition of the patient was as a rule adversely affected by a combination of haemorrhage and shock resulting from the operation of plugging. The next step was to restore the general condition of the patient by morphine and blood transfusion. When this was considered satisfactory Caesarean section was performed irrespective of the state of the foetus. When either marginal or lateral placenta praevia was diagnosed the membranes were artificially ruptured, whether the patient was in labour or not, and as much liquor as possible was allowed to escape. This usually led to satisfactory descent of the presenting part, and packing the vagina was employed only if bleeding was profuse or continuous.

4. In all cases replacement of blood loss by early and adequate transfusion was carried out.

5. The performance of external podalic version and pulling down a leg was regarded as unnecessary interference, but where a complete breech presentation was encountered and the os was sufficiently dilated a leg was pulled down to effect pressure by means of the half-breech. Willett's scalp forceps were employed in one or two isolated cases after the removal of the haemostatic packing.

6. Stress is laid on efficient packing of the vagina. The gauze employed was in the form of rolls 4 inches wide and 6 yards long. These were soaked in 5 per cent. dettol solution, and were packed tightly into the fornices. Each additional roll used was tied to the end of the preceding one. The average number of rolls was three for primigravidae and five for multigravidae. The packing was left *in situ* for twenty-four hours or until it was expelled during labour by the presenting part. This latter desirable result was obtained in most cases. Catheterization of the bladder was usually necessary while packing was in position. The advantages claimed for efficient packing are: (*a*) bleeding can be completely arrested, and time is gained to restore the patient's general condition; (*b*) the vascular sinuses exposed by placental separation are compressed and clotting can occur; (*c*) while packing of the vagina in conjunction with artificial rupture of the membranes is a recognized stimulus to uterine contraction we have not found that unduly rapid delivery resulted. In a certain number of cases further bleeding occurred after removal of the packing, but this was effectively controlled by repacking.

The Case Results

We have arranged in tabular form the case results of Groups A and B. The stillbirth rate is included for the sake of completeness. Plugging the vagina is regarded by some authorities as a dangerous procedure owing to the increased incidence of sepsis. However, since plugging has been an essential feature we feel that our account would be incomplete without a consideration of the degree and site of infection occurring after all forms of treatment.

TABLE I

Group A

Method of Treatment	Central				Marginal				Lateral			
	No. of Cases	Morbid	Died	No. of Stillbirths	No. of Cases	Morbid	Died	No. of Stillbirths	No. of Cases	Morbid	Died	No. of Stillbirths
No treatment	—	—	—	—	—	—	—	—	16	—	—	7
*A.R.M. and binder	—	—	—	—	20	1	—	10	18	—	—	4
A.R.M., binder, and plugging	1	—	—	1	42	18	2	30	16	1	—	8
Caesarean section	5	—	—	—	†3	—	—	—	1	—	—	—
Plugging - Caesarean	5	1	—	—	1	—	—	1	—	—	—	—
Pulling down leg	1	—	—	1	13	1	—	12	1	—	—	1
Totals	12	1	—	2	79	20	2	53	52	1	—	20

* A.R.M.—Artificial rupture of membranes. † 2 for extended breech presentation, 1 for mild disproportion. ‡ Extended breech presentation.

Number of cases, 143; mortality rate, 1.4 per cent.; morbidity rate, 15.4 per cent.; stillbirth rate, 53.8 per cent.; number of transfusions, 37.

Group B

Method of Treatment	Central				Marginal				Lateral			
	No. of Cases	Morbid	Died	No. of Stillbirths	No. of Cases	Morbid	Died	No. of Stillbirths	No. of Cases	Morbid	Died	No. of Stillbirths
No treatment	*1	—	1	1	—	—	—	—	24	3	—	6
A.R.M. and binder	—	—	—	—	4	—	—	3	14	—	—	3
A.R.M. and Willett's forceps	5	3	—	5	12	1	1	8	14	2	—	3
A.R.M. and plugging	4	—	3	4	13	2	—	8	8	1	—	4
Caesarean section	11	3	1	3	3	—	—	—	2	1	—	—
Plugging - Caesarean	1	—	—	—	—	—	—	—	—	—	—	—
Pulling down leg	9	2	1	9	16	3	2	15	2	—	—	1
Totals	31	8	6	22	48	6	3	34	64	7	—	17

* Moribund on admission.

Number of cases, 143; mortality rate, 5.6 per cent.; morbidity rate, 14.7 per cent. stillbirth rate ,50.05 per cent.; number of transfusions, 10.

TABLE II

Group A (Total cases morbid = 22)

Method of Treatment	Site of Infection						
	Urinary	Mild Genital	Severe Genital	Femoral Phlebitis	Respiratory	Tonsillar	Totals
No treatment	—	—	—	—	—	—	—
A.R.M. and binder	1	—	—	—	—	—	1
A.R.M., binder, and plugging ..	3	11	1	1	2	1	19
Caesarean section	—	—	—	—	—	—	—
Plugging + Caesarean	—	—	—	1	—	—	1
Plugging down leg	—	1	—	—	—	—	1

Group B (Total cases morbid = 21)

Method of Treatment	Site of Infection						
	Urinary	Mild Genital	Severe Genital	Femoral Phlebitis	Respiratory	Tonsillar	Totals
No treatment	—	3	—	—	—	—	3
A.R.M. and Willett's forceps ..	—	5	1	—	—	—	6
A.R.M. and plugging	—	2	1	—	—	—	3
Caesarean section	—	1	—	1	2	—	4
Plugging + Caesarean	—	—	—	—	—	—	—
Pulling down leg	—	3	1	1	—	—	5

Consideration of Results

The 143 cases of Group A were treated according to the method outlined above, and from a study of the figures it is evident that:

1. Many cases (38 per cent.) required only artificial rupture of the membranes and the application of a tight binder. Such cases were lateral or marginal insertions occurring mostly in multiparae admitted in labour. Uniformly good results are to be expected in this type of case, and are obtained in this hospital and elsewhere.

2. Haemorrhage was profuse enough to require immediate steps to arrest it in about half the cases (47 per cent.).

3. Plugging the vagina has proved an extremely successful method of achieving haemostasis.

We therefore venture to conclude that the striking decrease in the mortality rate in Group A is due to : (*a*) the co-operation and team-work made possible by the standardization of treatment ; (*b*) the prompt arrest of severe haemorrhage by plugging the vagina ; (*c*) replacement of blood loss by transfusion ; (*d*) treatment of shock before delivery of the patient. A comparison of the total morbidity rates for the two groups—Group A, 15.4 per cent. ; Group B, 14.7 per cent.—reveals but little increase in the incidence of sepsis, and the difference in stillbirth rate is negligible.

Out of a total of 286 cases treated, 146 required active intervention per vaginam, excluding those treated by artificial rupture of the membranes only. Seventy-three of these cases were plugged and seventy-three were treated by either pulling down a leg with or without podalic version or the application of Willett's forceps. The plugged series showed two cases of severe and fourteen cases of mild genital infection, and the other series two cases of severe and ten of mild genital infection. The increase in sepsis rate is therefore very small. It is interesting to note that Caesarean section was performed on six occasions, from six to twenty-four hours after plugging, and that only one of these patients had a morbid temperature, due to a femoral thrombosis occurring on the twelfth day. We feel that we are entitled to suggest that plugging the vagina for placenta praevia is not attended with an undue liability to sepsis when its morbidity rate is compared with that following other forms of treatment which involve intervention per vaginam.

Summary

1. The results of treatment of 286 cases of placenta praevia are reviewed.

2. The standard method of treatment at Queen Charlotte's Hospital is described. Emphasis is laid upon the value of a preconceived routine, which included plugging and replacement of blood loss.

3. We believe that the improvement in the mortality rate is due to this method.

4. Evidence is offered in support of the contention that vaginal plugging in cases of placenta praevia is not associated with a high rate of sepsis when compared with that of other forms of treatment.

In conclusion we should like to thank the members of the honorary staff of Queen Charlotte's Hospital for the use of the case records, and in particular Mr. Leonard Phillips for permission to publish an account of his routine treatment. We also wish to express our appreciation of the work of the labour ward staff, to whose co-operation much of the improvement in results is due.

CONCERNING THE BOX MASK FOR OXYGEN ADMINISTRATION

BY

J. ARGYLL CAMPBELL, M.D., D.Sc.

(National Institute for Medical Research, Hampstead)

The main outline of this method of oxygen administration was originally described in the *Journal* about two years ago (Campbell, 1936). Since then some additional information (Barach, 1937 ; Campbell, 1937a, 1937b) has been published. A number of the masks have been used on patients and further data have been obtained, while various criticisms have arisen. These are dealt with below.

Comfort of the Patient

With the earlier types of mask vision was rather restricted. In more recent types wider vision has been provided by removing the shoulders of the mask and shifting the inlet tube for oxygen from the front of the forehead to a horizontal position inside the mask as in some of the earlier experimental masks. Fig. 1 illustrates the transparent type made of celluloid acetate. This material is neat, but it is not durable and must be washed only in cold water, as warm water or exposure to the sun will warp it. This celluloid acetate is not very inflammable. More durable material is aluminium, which, although greater in cost, is perhaps more suitable for hospital patients. The oxygen enters the mask through perforations in the horizontal portion of tubing inside the mask. These perforations must be directed upwards so that the incoming oxygen strikes the middle of the top of the mask. A bobbin flow-meter records the rate of oxygen flow, and an automatic regulator is used for the cylinder.

Some patients have found the mask rather warm to the face. This was due in some cases to enclosing the cheeks within the mask. The opening at the back of the mask should be bent to include only the nose and mouth, while

the cheeks should be excluded. Thus only a small portion of the total area of the face is enclosed within the mask, and on warm days more of the skin of the arms may be exposed to the external air to aid loss of body heat. The sensation of warmth is usually only temporary, and is noticeable mainly during the early period of wearing the mask. In colder atmospheres some prefer the warmth on the face; also, the temperature of the skin of the enclosed portion of the face is not so high as that of the

FIG. 1.—Transparent (celluloid acetate) mask in position, with bobbin flow-meter and automatic regulator for gas cylinder. (Photo by L. W. Collison.)

clothed body. The opening at the back of the mask is lined with lint, which is kept in position with adhesive plaster and may be easily renewed. Two or three folds of lint are used to keep the mask airtight against the nose and face.

Expectoration may take place through the lower open end of the mask if a wide-mouthed vessel is used to collect the sputum. Food and medicine may be administered through a door on the front of the mask. An easier method, during meals, is to hold the mask in position by hand and remove it only at the brief periods when food is actually being placed in the mouth. In any case breathing usually ceases at this moment.

This type of mask has been used on some patients for prolonged periods, up to six weeks, without any greater discomfort than with other methods. Its advantages have been stated in the earlier papers. It has an advantage over nasal methods in that it may be used when the nasal passages are blocked. In emergency a box mask may be made from a cardboard box and a rubber tube in ten minutes (Campbell, 1936).

Oxygen Pressure Inside the Mask

Analysis of the gas inside the mask was carried out with Haldane's large apparatus, using about 5 c.cm. of the gas mixed with about 15 c.cm. of nitrogen. Samples were taken, either at the end of inspiration or of expiration, by means of an evacuated sample tube to the upper end of which a fine-bore glass tube, filled with mercury, was attached. The position in the mask from which the samples were withdrawn was important. It was 2 to 3 cm. to the right of the nose, at a level of about 1 cm. above the opening in the right nostril. This point was regarded as being equally affected by the incoming oxygen at the top of the mask and the incoming air, or expired air, at the lower end of the mask. The gas obtained probably approximated in composition to that inspired by the subject under observation. The subject (C. P.) was 44 years of age, weighed 64.5 kg., and was 157.5 cm. in height; his respiratory volume, while sitting quietly under normal conditions, was about 7.5 litres per minute. Two gases were used—pure oxygen and a mixture of 7 per cent. carbon dioxide with 93 per cent. oxygen. Fig. 2 records the results for oxygen pressure in percentages of an atmosphere with different rates of flow of the special gases. The oxygen percentages within the mask are slightly

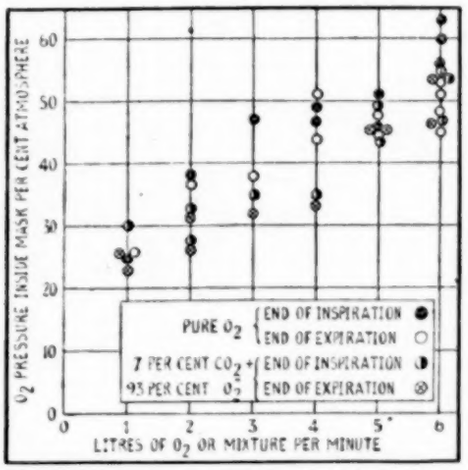

O_2 PRESSURE INSIDE MASK PER CENT ATMOSPHERE
LITRES OF O_2 OR MIXTURE PER MINUTE
PURE O_2 { END OF INSPIRATION / END OF EXPIRATION
7 PER CENT CO_2 + 93 PER CENT O_2 { END OF INSPIRATION / END OF EXPIRATION

FIG. 2.—Oxygen pressures at the end of inspiration and of expiration inside the mask, just above level of right nostril, with various rates of flow of gas.

higher when pure oxygen is used than with the carbon dioxide mixture. Also, as a rule the percentages at the end of inspiration are slightly higher than those at the end of expiration. With 6 litres of the special gases per minute the oxygen percentages in the mask are usually between 50 and 60, and with 1 litre per minute they are between 20 and 30.

Oxygen Pressure in the Lung Alveoli

Using Haldane's technique, samples of alveolar air were taken at the end of an ordinary inspiration, immediately after removal of the mask from the face. Generally

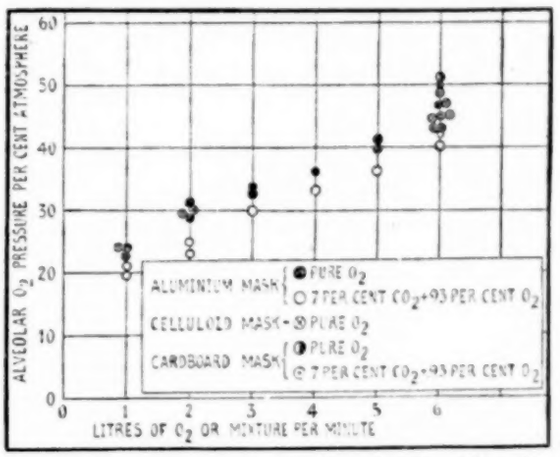

ALVEOLAR O_2 PRESSURE PER CENT ATMOSPHERE
LITRES OF O_2 OR MIXTURE PER MINUTE
ALUMINIUM MASK { PURE O_2 / 7 PER CENT CO_2+93 PER CENT O_2
CELLULOID MASK - PURE O_2
CARDBOARD MASK { PURE O_2 / 7 PER CENT CO_2+93 PER CENT O_2

FIG. 3.—Oxygen pressures in the lung alveoli, with various rates of flow of gas.

speaking, the alveolar oxygen pressures (Fig. 3) are about 10 per cent. lower than the oxygen pressures within the mask (Fig. 2). Thus at 6 litres of pure oxygen per minute the oxygen pressures in the alveoli of the lung are about 40 to 50 per cent. With the carbon dioxide mixture the alveolar oxygen pressures are slightly lower than with pure oxygen. The various masks tested give similar results.

Carbon Dioxide Pressure Inside the Mask

This was measured at the same point as the oxygen pressure inside the mask. The results (Fig. 4) indicate that with 6 litres of pure oxygen per minute the carbon dioxide pressure averages about 1 per cent. and does not rise

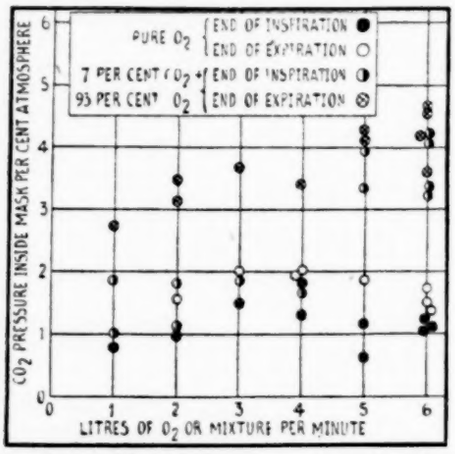

PURE O2 END OF INSPIRATION
END OF EXPIRATION
7 PER CENT CO2 + 93 PER CENT O2 END OF INSPIRATION
END OF EXPIRATION
CO2 PRESSURE INSIDE MASK PER CENT ATMOSPHERE
LITRES OF O2 OR MIXTURE PER MINUTE

FIG. 4.—Carbon dioxide pressures at the end of inspiration and of expiration inside the mask, just above level of right nostril, with various rates of flow of gas.

above 2 per cent. Most patients will not be affected by such concentrations of carbon dioxide. It is known from experience in submarines that discomfort is not noticeable until the carbon dioxide pressure reaches 3 per cent. Also, certain patients, according to the teaching of Yandell Henderson, are benefited by carbon dioxide as a respiratory stimulant, and he advocates from 5 to 10 per cent. To obtain about 5 per cent. inside the mask it is necessary to use a mixture of 7 per cent. carbon dioxide and 93 per cent. oxygen at a flow of 6 litres per minute (Fig. 4). Breathing about 5 per cent. of carbon dioxide increased the volume breathed by the present subject from the normal figure of 7.5 litres to about 12 litres per minute; depth—not rate—of breathing was increased. With a more rapid flow and mixtures containing higher percentages of carbon dioxide, the carbon dioxide pressure in the mask may be further increased. In cases of carbon monoxide poisoning 10 per cent. carbon dioxide with 90 per cent. oxygen is advisable with this mask until respiration is well established, when pure oxygen should be used (Campbell, 1937a).

Carbon Dioxide Pressure in the Lung Alveoli

Fig. 5 gives the results for carbon dioxide pressure in the alveoli of the lung under similar conditions. Normally the subject employed has an alveolar carbon dioxide pressure of about 5 per cent. The mask being worn and pure oxygen flowing from 1 to 6 litres per minute, the alveolar carbon dioxide pressure is usually somewhere between 5 and 6 per cent. The increase in alveolar carbon dioxide pressure above the normal is not necessarily due to the mask, because administration of oxygen at high percentage by any method tends to increase the carbon

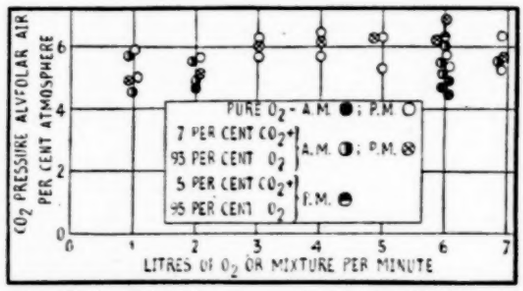

PURE O2 - A.M. ; P.M.
7 PER CENT CO2 + 93 PER CENT O2 A.M. ; P.M.
5 PER CENT CO2 + 95 PER CENT O2 P.M.
CO2 PRESSURE ALVEOLAR AIR PER CENT ATMOSPHERE
LITRES OF O2 OR MIXTURE PER MINUTE

FIG. 5.—Carbon dioxide pressures in the alveoli of the lung, with various rates of flow of gas.

dioxide pressure in the tissues, and similar alveolar carbon dioxide pressures are obtained with other methods. With 6 litres of pure oxygen the alveolar figures are usually lower one to three hours after lunch compared with samples taken four hours after breakfast. Such variations are connected with the acid-base changes concerned with digestion or other factors. At 6 litres per minute, and with the mixture of 7 per cent. carbon dioxide and 93 per cent. oxygen, there is a slight further increase in alveolar carbon dioxide pressure.

All the observations recorded in the charts in Figs. 2 to 5 were made in a room with the temperature purposely on the warm side—that is, at about 20° C. and a kata-thermometer cooling power 5 to 6, with air velocity usually between 20 and 40 feet per minute. These are fairly comfortable indoor conditions for a patient in summer weather.

Position of the Mask and Effects of Draught

In draughty wards the mask should be adjusted so that its lower front edge is about 3 cm. above the chest, or the head of the bed should be screened. As pointed out before

Table showing Effects of Draughts and Their Correction: O_2 Flow 6 Litres per Minute

Expt. No.	Date	Temp. °C.	Cooling Power	Air Velocity (ft. per min.)	Alveolar Pressures per cent. atm.		Conditions of Mask		
					CO_2	O_2	Mask	Curtain Used	Position (cm. above chest)
1	29/10/37	22.0	8.6	200	5.7	28.5	Celluloid	Nil	3
2	1/11/37	20.0	6.0	40	5.7	40.5	"	"	"
3	18/11/37	20.5	8.8	160	5.8	31.0	Aluminium	"	"
4	1/11/37	20.0	10.0	210	5.8	45.0	Celluloid	Lint (8 cm. long)	"
5	2/12/37	23.0	4.8	40	6.5	53.0	Aluminium	Cardboard grid	10
6	13/11/36	20.5	5.0	20	5.9	40.0	"	Nil	"
7a	3/12/37	21.5	10.0	215	5.9	36.2	"	Entire cardboard (two-thirds closed)	"
7b	"	"	"	"	5.9	35.8	"	Cardboard grid	"
7c	"				5.7	35.0	"	"	"
7d	"	"	"	"	5.8	28.8	"	Nil	"

(Campbell, 1937a), if the head is raised so that this edge is 10 cm. above the chest the efficiency of the mask is affected somewhat by draughts, so that with 6 litres of pure oxygen per minute the alveolar oxygen pressure is about 30 to 40 per cent. in place of 40 to 50. The chest acts as a damper to draughts, so that with the mask nearer the chest less oxygen is lost from the mask and fewer draughts of air enter the mask. In patients with a long neck the mask may be made longer and narrower without change in volume of inside space, but a simpler corrective is to partially close the bottom of the ordinary mask (see Table, Experiment 5).

Dr. R. V. Christie also kindly pointed out that draughts affect the efficiency to some extent. My results for the effects of draughts are given in the table, using an oxygen flow of 6 litres per minute in all cases.

With an air velocity of 40 feet per minute and the front edge of the mask 3 cm. from the chest, the alveolar oxygen pressure is about 40 per cent. (Experiment 2); with an air velocity of 160 to 200 feet per minute the oxygen pressure is lowered to about 30 per cent. (Experiments 1 and 3). The effect of such a draught is easily countered by fixing with adhesive tape a curtain of lint about 8 cm. in length all round the bottom of the mask, as in Experiment 4 in the table; the alveolar oxygen pressure is 45 per cent. in spite of an air velocity of 210 feet per minute.

In Experiment 5, with the head held up and the mask 10 cm. from the chest, the alveolar oxygen pressure is kept at a high level, 53 per cent., by closing the lower end of the mask with a cardboard grid, containing air spaces 1 cm. square alternating with portions of solid cardboard of the same dimensions. In Experiment 6, with lower air velocity, it is shown that no closure of the bottom of the mask is required. In Experiment 7d in the table, with an air velocity of 215 feet per minute and the lower edge of the mask 10 cm. from the chest and the bottom of the mask freely open, the alveolar oxygen pressure is lowered to about 29 per cent., but by means of the perforated cardboard grid or by closing two-thirds of the lower end of the mask with a piece of entire cardboard the alveolar oxygen pressure is raised to about 35 per cent. (Experiments 7a, 7b, and 7c). The curtain of lint is the most efficient means of protecting against draughts, but under ordinary circumstances the head of the bed may be provided with screens so that no special closing of the lower end is required. If the patient is restless and moves the head about much, then the bottom of the mask may be closed by one of the above methods to gain greater efficiency. Even at the worst, with the bottom of the mask open and in a draught, the patient is still getting oxygen in the lungs at a pressure of about 30 per cent.—that is, more than double the normal—with a flow of 6 litres of oxygen per minute.

For sedentary individuals Sir Leonard Hill and others have recommended air velocities of 3, 7, and 17 metres per minute, with air temperatures 15°, 18°, and 21° C. respectively. Under these conditions the mask gives about 40 to 50 per cent. of oxygen in the alveoli of the lungs with a flow of 6 litres of oxygen per minute.

Dr. A. L. Barach (personal communication) uses a small injector on the oxygen inlet tube so that some air is drawn in; this increases the flow through the mask, which is reduced in size. This draught helps to remove carbon dioxide and cools the face, but may be too rapid and so disturb certain types of patients. He uses also a whistle arrangement which gives warning when the oxygen tube is kinked. He recommends the apparatus for patients and for passengers in aeroplanes (Barach, 1937).

Summary

1. The recent type of mask made of aluminium or transparent celluloid acetate for oxygen administration is described. Vision is now much wider. The comfort of the patient is considered.

2. With 6 litres of pure oxygen per minute the oxygen pressure in the alveoli of the lung is kept at about 40 to 50 per cent. under ordinary comfortable conditions of ventilation.

3. With 6 litres per minute of a mixture of 7 per cent. carbon dioxide and 93 per cent. oxygen the patient breathes about 5 per cent. of carbon dioxide, and the alveolar oxygen pressure is about 40 to 45 per cent. This or a similar mixture may be used when a respiratory stimulant is required.

4. The effects of draughts and of the position of the mask on its efficiency are considered. Simple means of counteracting effects of excessive draughts or excessive movement of the head are given.

I am indebted to Mr. C. Pergande, who acted as subject in the observations. The mask may be obtained from Messrs. Siebe, Gorman and Co., 187, Westminster Bridge Road, S.E.1.

REFERENCES

Barach, A. L. (1937). *J. Amer. med. Ass.*, **108**, 1868.
Campbell, J. Argyll (1936). *British Medical Journal*, **1**, 1245.
—— (1937a). *Lancet*, **1**, 82.
—— (1937b). *British Medical Journal*, **1**, 526.

INTRANASAL APPLICATION OF POLLEN SOLUTION IN HAY FEVER

BY

CLEMENT FRANCIS, M.A., M.B., B.Ch.
Surgeon, Metropolitan Ear, Nose and Throat Hospital

The object of this short article is to describe a method of treatment which I have found useful during recent years in relieving hay fever. I have employed it in numerous cases, either alone or in conjunction with other means; and I find it invaluable both as a preventive of attacks and for use in relieving an already existing attack.

Technique

The method is extremely simple, and consists in spraying the nasal cavities with a few drops of a sterile solution of grass pollen. The solution should be applied to the septum, the middle and inferior turbinals, and in particular to any hypersensitive areas. If this is done during the season in the case of a hay fever patient the immediate effect will be to produce a short bout of sneezing followed by the usual symptoms of hay fever. The effects of this artificially produced attack quickly subside, and the patient then becomes more resistant to the pollen in the air, with the result that, for several days to a week or more, many patients remain free from all symptoms of hay fever. The procedure may, if necessary, then be repeated.

The method above described may with advantage be used in conjunction with other means of treatment, and if there are any abnormally sensitive areas in the nose I make it a practice to treat these (Francis, 1934) before applying the pollen solution. If carefully carried out both

methods may be employed on the same occasion, with the result that not infrequently no further symptoms of hay fever will occur during the remainder of the season. The strength of the different pollen solutions employed depends on the severity of the symptoms in any particular case, as well as the weather conditions. In severe cases, in hot weather, small doses should be used.

Seasonal Treatment

In an average case seen during the hay fever season, with mild symptoms, an initial dose of 10 units of pollen solution may be given intranasally, and if this does not produce mild sneezing within five minutes the dose may be repeated. Subsequent doses may be increased by 25 per cent. at intervals depending on the length of time during which the patient remains symptom-free. In some cases no subsequent dose is necessary. It is convenient to arrange that the desired dose is contained in 0.25 c.cm. to 0.5 c.cm. of fluid, as this is a suitable amount to apply at one time. Necessary dilutions of concentrated pollen solutions may be made with carbol saline (0.5 per cent. phenol in normal saline), and the dose measured in a graduated medium sprayer.

If on any occasion there is pronounced local reaction, the dose should not be increased at the next application, but the same dose again given, when the local reaction will be decidedly less than on the previous occasion. After this the next dose can again be increased by 25 per cent., as a rule without resulting in any great reaction. It is difficult to lay down any hard-and-fast scale of doses, as patients vary considerably in their response to different pollens, and also in their response to the same pollen under varying conditions of weather. In hot dry weather the local reaction produced by a given dose of pollen solution will be greater than that from the same dose received by the same patient in cold wet weather. All the above factors must be taken into account when considering the best dose for any particular occasion.

It is important, so far as is possible, to include in the pollen solutions employed all the grass pollens to which the patient chiefly reacts; for a patient may, after several applications, be made quite immune to a concentrated solution of one kind of grass pollen, although a different type of grass pollen of a lesser concentration sprayed into the nose may still produce sneezing and other hay fever symptoms.

It has constantly been observed that if the same dose of the same pollen solution has been sprayed into the nose of any patient on two or more occasions at intervals of a few days or a week, or even longer, the hay fever symptoms produced have become progressively less on each occasion.

Pre-seasonal Treatment

Before the hay fever season begins larger doses may be given, and in an average case doses of 100 to 200 units of pollen solution may be sprayed into the nose to commence with, followed by a 30 per cent. increase at intervals of two days or more. These doses do not as a rule cause more than slight transient symptoms of hay fever, and there is no doubt that the pre-seasonal intranasal application of pollen solution increases the patient's resistance to pollen. Mackenzie (1922) has reported favourably on this method, and Caulfeild (1922) has published good results from pre-seasonal intranasal inoculation with pollen ointment, although neither author claimed that the method by itself produced complete immunization. I have never seen any untoward symptoms develop as a result of applying pollen solution in the way described, either before or during the hay fever season.

It is better to allow the artificially produced attack to subside naturally than to attempt to clear the nose immediately by the application of powerful vasoconstrictors; for in the latter case, although the nose may become temporarily clear, congestion usually returns after one or two hours, and it then remains obstructed for a longer period than if it had been allowed to clear naturally. As a rule, if left alone, all symptoms of the artificially produced attack completely cease in from ten minutes to one hour.

Conclusions

The advantages of intranasal inoculation in hay fever are that it can conveniently be used in conjunction with other methods, that it provides a means of giving relief to patients during an attack, and that it increases the resistance to pollen of patients who are intolerant of injection methods.

While it is not asserted to be a method which by itself results in complete cure, it can often be advantageously employed in cases where other means have failed or have only been partly successful.

REFERENCES

Caulfeild, A. H. W. (1922). *J. Amer. med. Ass.*, **79**, 125.
Francis, C. (1934). *Practitioner*, **132**, 614.
Mackenzie, G. M. (1922). *J. Amer. med. Ass.*, **78**, 787.

Clinical Memoranda

Treatment of Diphtheria

During the period 1935–6 I gradually came to think that the early deaths in cases of diphtheria could not be due to a toxaemic condition, but more probably to some underlying infection which was earlier in operation than the toxin of diphtheria. This view was taken by reason of the early cardiac involvement, such as the quick pulse, the onset of pericarditis, the haemorrhagic rashes, the early nephritis, and also the haemorrhagic edge of the diphtheritic membrane, to name but a few of the earlier symptoms noted in severe cases.

In support of this view were the more definite effects of the toxaemia of diphtheria, as instanced rather in the later stages (when it is admitted as a definite toxic condition), such as the slowing of the heart and the other paralytic symptoms. I thought that the more likely infection to produce these earlier symptoms would be caused by an organism common to the throat and associated with early cardiac and renal involvement. It appeared that the most likely organism—a common cause of faucial, cardiac, and renal disease—would be a streptococcus, probably one of the haemolytic type. In view of this, on January 22, 1936, I decided to try the effect of treating both a diphtheritic and a streptococcal condition.

The first case this was tried on was a girl aged 15 who was admitted to hospital on the second day of infection. She was cyanosed, with a rapid running pulse, with petechiae all over the chest and neck, and with extensive membrane surrounded by a haemorrhagic areola. She was given, on admission, 100,000 units of anti-diphtheritic serum and also 20 c.cm. of

anti-puerperal serum. The following day she was given 50,000 units of anti-diphtheritic serum and a further 20 c.cm. of anti-puerperal serum. She made an uninterrupted recovery.

It is interesting to note that this girl's two brothers died within seventy-two hours of being taken ill with diphtheria. Following this, all severe cases were given varying amounts of either anti-puerperal serum or anti-scarlet-fever serum. Towards the end of 1936 there were several cases of cross-infection with scarlet fever, and it was decided, with the full approval and consent of the medical officer of health (Dr. Parry Pritchard), that 5 c.cm. of anti-scarlet-fever serum should be given to all cases of diphtheria on admission.

This procedure has been carried out during the whole of the year 1937 (except for three cases where the medical officer in charge of the cases did not wish the anti-scarlet-fever serum given). Severe cases, however, were all given increasing doses—10 c.cm. or more—of anti-scarlet-fever serum where it was considered necessary. During this period 209 cases of diphtheria were admitted to the hospital. Of these only one died. This patient, however, was admitted on the fifth or sixth day of illness and, prior to admission, was more or less of an invalid, with cardiac trouble following rheumatic fever when very young; she was ten years of age and died within twenty-four hours of admission. Of these 209 cases, eleven were cases of laryngeal diphtheria.

I feel that this low death rate should be brought to the notice of those concerned in the treatment of diphtheria. Research might possibly identify streptococci in the blood in early cases of severe and/or haemorrhagic diphtheritic cases.

Caernarvon. W. HILTON PARRY, M.B., Ch.B.

A Severe Case of Chicken-pox with Some Unusual Features

A small outbreak of chicken-pox recently occurred in the scarlet fever ward of the Blackburn Corporation Hospital, due to the admission of a case incubating the disease. All the secondary cases were of a mild type, except the one to be described, which was of an unusually severe nature and showed many interesting features.

CASE RECORD

A boy aged 3½ became ill on November 29, 1937, and the following day was removed to hospital suffering from a mild attack of scarlet fever. There was no history of any previous illness. The disease ran an uneventful course, there being no complications other than slight excoriation of the nostrils. The patient, who was unvaccinated, was a chicken-pox contact, and on December 28, 1937 (the thirtieth day of the scarlet fever), the first vesicles were noticed. These continued to come out steadily in crops, and by January 1, 1938, the eruption was extensive and in character and distribution very typical of chicken-pox. There was no inflammatory condition of the throat, and no vesicles were present upon the buccal mucous membrane.

By January 3 his condition was worse, and gave cause for anxiety. Towards evening a group of petechial haemorrhages could be seen covering an area of approximately two square inches on the front of each wrist. For the following two days his condition was grave. Petechial haemorrhages were now noticed on the trunk and limbs, but were most profuse around the wrists and forearms. Fresh chicken-pox vesicles were still appearing, and in fact continued to do so until January 13. Two areas, one on the scalp and one on the neck, showed fairly extensive ulceration. The heart and lungs were normal and the urine at this time scanty but clear. The latter was tested daily, and on January 6 showed a faint trace of albumin (this was ten days after the onset of the chicken-pox and thirty-nine days after the onset of the scarlet fever). During the next few days the albuminuria increased and there was now a considerable degree of oliguria. The patient was drowsy and remained gravely ill until January 16, when some improvement in his condition was noticed, although there was still profuse discharge from the ulcerative areas. From this date he made slow but steady progress towards recovery. The albuminuria persisted, but by February 12 the urine was clear and the ulcers had practically healed.

COMMENTARY

The interesting points in this case are: (1) the severe nature of the disease as shown by the general toxaemia, petechial haemorrhages, and ulceration; (2) the fact that fresh crops of vesicles occurred for no less than seventeen days; (3) the occurrence of nephritis. Haemorrhages into the vesicles have been described by Healy (1936), Wanklyn (1922), and Whitaker (1915) and the term haemorrhagic chicken-pox applied to these cases. According to Goodall (1928), however, cases showing petechial haemorrhage into the skin, as in the case described, also fall within this category.

The case certainly comes under the definition of ulcerative chicken-pox, and it is interesting to note that Ker (1929) found this condition exclusively in convalescent scarlet fever cases.

Nephritis is described as a rare complication of chicken-pox, and we regard the severe attack of the latter as a more likely cause of the nephritis in this case than the initial attack of scarlet fever, although the possibility of a post-scarlatinal complication cannot be entirely ruled out.

Summary

A convalescent scarlet fever case while in hospital contracted a severe attack of chicken-pox showing the unusual features of petechial haemorrhages and ulceration. Nephritis occurred as a complication. Fresh crops of vesicles continued to appear for the abnormally long period of seventeen days.

We are much indebted to Dr. V. T. Thierens (medical officer of health) for his permission to publish this case.

J. B. TILLEY, M.D., D.P.H.
J. F. WARIN, M.D., D.P.H.
Blackburn. Assistant Medical Officers of Health.

REFERENCES

Goodall, E. W. (1928). *Text Book of Infectious Diseases*, p. 534, London.
Healy, J. W. (1936). *Brit. J. Child. Dis.*, **33**, 201.
Ker, C. (1929). *Infectious Diseases*, p. 217.
Wanklyn, W. McC. (1922). *British Medical Journal*, **2**, 977.
Whitaker, A. G. (1915). Ibid., **1**, 15.

The eighteenth report of the Joint Council of the Order of St. John and the British Red Cross Society covers the year 1937. In his foreword the chairman, Sir Arthur Stanley, pays tribute to the late Dame Sarah Swift, whose death has deprived the Joint Council of one of its most active and efficient members who was loved and respected by all who knew her. Among many other matters an account is given of the work of the Central Bureau of Hospital Information, established in 1920 with the co-operation of the British Hospitals Association. The expansion of its activity proves that it meets a definite need; one very useful service is publication of the *Hospitals Year-Book*. Copies of the report may be had from Joint Council House, 12, Grosvenor Crescent, S.W.1.

Reviews

NEW WORK ON IMMUNITY TO TRANSPLANTED TUMOURS

The Influence of X-Radiation on the Development of Immunity to Heterologous Transplantation of Tumors. By Johannes Clemmesen. Translated into English by Robert Fraser. (Pp. 160; 13 photographs; 8 tables; 12 charts. 10s.). Copenhagen: Levin and Munksgaard; London: Humphrey Milford, Oxford University Press. 1938.

This monograph describes important research work bearing on immunity to transplanted tumours. As is well known, attempts to make successful grafts of a tumour growing in one species of mammal into an animal of a different species have hitherto been almost always unsuccessful. It is now shown that rats can be made temporarily susceptible to implants of certain mouse tumours by previous exposure *in toto* to strong *x*-radiation. The effect is not permanent, and after two to four weeks the engrafted tumours disappear. That actual growth has nevertheless occurred is proved both by the size attained by the implants and by the muscular invasion by neoplastic cells. When regression has taken place the rat is immune to further inoculations, and this immunity cannot be destroyed by subsequent exposures to *x* rays. If the rats are irradiated four to five days *after* implantation, the effect is less marked than when they are irradiated beforehand; this is probably because the cells of the implant have already been affected by the normal defence mechanism against foreign tissue elements. It does not seem to matter if the irradiation is carried out immediately or several days before the implantation is made. By varying the *x*-ray dose it is found that with bigger doses the implants attain a larger size and persist longer than when the dose is smaller. The general conclusion drawn from these experiments is that irradiation delays the mobilization of the normal defensive forces until the graft has produced enough reaction against itself to inhibit further growth and to cause regression. The author concludes that at least two factors are concerned in the production of this immunity to foreign cells, of which one is affected by the *x* rays, while the other is not. Special care has been taken throughout these experiments to ensure uniformity of experimental conditions and accurate standardization of dosage.

THE PHILOSOPHY OF SCIENCE

What Science Really Means: An Explanation of the History and Empirical Method of General Science. By Julius W. Friend and James Feibleman. (Pp. 222. 7s. 6d. net.) London: George Allen and Unwin, Ltd.

If men of science and general readers do not know what science is about it is certainly not for want of books on the subject. In the book before us Messrs. J. W. Friend and J. Feibleman set out to tell us *What Science Really Means,* and the wrapper of their volume advertises two other volumes, to which six Fellows of the Royal Society have contributed, apparently having much the same laudable object. Messrs. Friend and Feibleman, even if by summarily dismissing many writers of ability as logically confused or incompetent they sometimes irritate the reader, have produced an interesting volume.

They hold strongly that we ought to have a sound philosophy of science, but candidly face the common-sense objection that scientists who adhere to different philosophical interpretations do not disagree about their scientific work. "Does this mean, then," they ask, "that the question of the reality of the scientific subject-matter is meaningless?" Perhaps this *ad captandum* question suggests a certain defect of philosophical method. Because sincere Protestants and sincere Catholics are often patterns of Christian virtue, sensible people do not ask rhetorically whether there is any meaning in the difference between the two religious systems. The analogy is indeed relevant to our authors' undertaking; they argue, we think correctly, that a difference of philosophical standpoint may affect the growth of science and must affect the attitude towards science of the outsider. They point particularly to the so-called social sciences as the victims of a false philosophy. Their general argument that scientific method is uniform, that there is no antinomy between empiricism and rationalism, no warrant for holding that induction is *the* method or deduction *the* method of progress, we take to have been proved by the practice of all investigators. We doubt whether, *in practice,* there has ever been any disagreement on the point. It is not probable that the Empiricists whom Galen abused really did medical "experiments" at random, really tried everything impartially. It is quite certain that Galen, with all his love for philosophical general principles, did many odd experiments, with no other reason than to gratify his curiosity—which, as Karl Pearson once said, is the dominant motive of any real researcher.

When the reader comes to the end of the book, to the future, he may have legitimate doubts whether any philosophy, whether the most eloquent exposition of what science means, will be comforting. "There is a deadly logic involved between the given stage of a social order and the given stage of science. Though some small leeway may be allowed, their ability to separate is definitely confined within certain limits. Therefore the understanding of science on the part of a society is requisite for both science and society." That any large part of society will "understand" science any better than the mother of Zebedee's children "understood" the Master's doctrine, or will ever think of science as anything but a means of increasing the *commoda vitae,* is improbable. Tolerance, not understanding, is the best we can expect in any society which, like most existing societies, is ruled not by reason but by emotion. The danger is that toleration, as a practice, is by no means secure even in the countries where it is most praised, and is extinct elsewhere. Even our authors implicitly (on p. 199) commend pure science to the public on the ground that in the long run the purer science is the more likely is it that practical results will be obtained. Few can now be found to defend scientific pursuits explicitly on the ground that it is interesting to "find things out," whether the "things" are of any practical importance or not. Such an argument can only secure a hearing in a tolerant society.

HEALTH ADVICE FOR THE LAITY

Brush Up Your Health. By Hugh Clegg, M.A., M.B., M.R.C.P. (Pp. 119; with 20 drawings by Ward, and diagrams. 2s. 6d. net.) With a foreword by Lord Horder. London: J. M. Dent and Sons, Ltd. 1938.

One of the major problems of public health to-day is that of making medical knowledge available in useful form to the general public. Medical science is very rich, but its only really profitable employment is in prevention. Most ill-health is caused by human ignorance and folly. The need for sound and attractive books on the everyday realities of health and illness is not nearly met. There

is a great deal of rubbish written by persons who are not medically qualified and have, besides this negative handicap, the positive one of being obsessed with some unbalanced prejudice in favour of a particular regime. Dr. Clegg's little book is a breath of fresh air. It has the great advantage that it is written by a doctor with wide knowledge of recent discovery and current knowledge, and with a grasp of the application of this vast mass of learning to the simple facts of bodily health. Moreover, the author's experience in presenting information saves him from the error of being schoolmasterish. He says what he has to say in a conversational manner that makes the easiest reading, and he enlivens his discourse with quiet humour. The incongruous little illustrations also add much to the book, as a good sauce improves food. In the first chapter he tells the reader how to take stock —how to find out how much health he already has by means of a searching little questionary. The reader apportions marks as he thinks fit, and then adds up the score. After that Dr. Clegg deals in detail with the principal constituents of diet, with alcohol and tobacco, obesity, sight, constipation, and teeth. A sudden page of laxative advertisements is typical of his happy employment of humorous surprise to hold the attention. The chapter on "Bringing up your Children" is full of condensed wisdom, and that on "Bringing up Yourself" of applied psychology. Exercise, the skin, milk, preventive inoculation, and the fear of disease are only a few of the other subjects treated by a rapid fire of fact, sound inference, and helpful suggestion. This little work contains an incredible amount of meat and a few tough bits which those who take a different view will reject. Moreover, some of his advice would seem to postulate an independence and a prosperity which only a smallish percentage of the populace possess, and in fact he goes so far as to counsel: "To diminish the risk of getting cancer of certain exposed sites take care to get into or remain in the upper and middle class (that in which the incidence of such cancer is least), and not to fall into the class of 'unskilled workers.'" But on the whole the book is a valuable contribution to the task of securing that intelligent co-operation of the lay public without which the doctor can do little good.

A HISTORY OF NURSING

The Story of the Growth of Nursing—as an Art, a Vocation and a Profession. By Agnes E. Pavey, S.R.N. With a Foreword by Sir John Weir, K.C.V.O. (Pp. 426. 15s. net.) London: Faber and Faber. 1938.

The "how" and "why" of any sphere of human activity are always of interest. The origins and growth of medicine, the early attempts at the care of the human body, whether of helpless infants or of the feeble and aged or of the injured and sick, are subjects of interest to all who ponder the development of the social side of human life. Indissolubly linked with this is the growth of nursing as a necessary part of the provision for human care. Miss Agnes Pavey's book gives as inclusive and informative an account of the birth and development of each phase of nursing from the earliest to the present time as we have read. She shows what widely diverse external factors have influenced or determined the lines upon which nursing grew, and how greatly social factors and historical events have directed that growth.

After an introduction showing the influence upon pathology and medicine of primitive religion, of superstition and folk-lore, of early ideas, and of wars and of religious prohibitions, the author proceeds to the gradual discovery of the right causes for phenomena in the human body and in the world around. Then follows a rapid, but very effective and interesting, review of the records of the conditions of the ancient world—in Crete, Chaldea, India, China, Greece—and so to the strong humanitarian influence of the early Christian Church, through the Middle Ages, until the resurgence of nursing in the nineteenth century. The author shows that although the seeds of modern nursing were sown in the remote past, its full growth did not occur until recent times. Now there is no part of the world where good nursing is not valued and desired. She adds that nursing offers a wide sphere of useful and interesting activity to the women of our land. It is no longer the expression of a mystic art possessed only by the favoured of the gods or demons. Nor is it a work of self-abnegation or religious fervour undertaken as a penance, or for spiritual solace and uplift; nor even is it, entirely, a selfless answer to the call of human suffering. Much less is it a shunned and rather repulsive activity of the ignorant woman to whom no other calling is open. It has been all of these. But Florence Nightingale made it a dignified secular profession for which a thorough and arduous training is necessary.

The book is well written; it is most entertaining to read. We can conceive few more suitable gift-books likely to captivate the mind of young women who are wavering in their choice of professional work.

NEURO-OPHTHALMOLOGY

Neuro-Ophthalmology. By R. Lindsay Rea, B.Sc., M.D., M.Ch., F.R.C.S. (Pp. 568; 141 figures, 19 coloured plates. A coloured frontispiece. 42s. net.) London: W. Heinemann (Medical Books), Ltd. 1938.

To the sprawling and unsystematized literature dealing with the borderland of neurology and ophthalmology Mr. Lindsay Rea has added a comprehensive volume which makes a brave attempt to bring together a diffuse mass of information. As such, his book is to be welcomed, and his industry can only command respect. There is much in this volume that will be new to expert ophthalmologists and neurologists, and not a little that should be known more widely than it is. There is so much in the book that is helpful that the reviewer is loath to draw attention to its serious defects. The material collected covers such a wide range that analysis, assessment, and critical systematization are essential. The collection of facts is a starting-point of a comprehensive treatise, but not by any means its end. The facts are here, but the critical survey is almost completely lacking, making the book essentially a collection of raw material. Innumerable and lengthy extracts from different authors, very often saying the same thing in different words, a loose style in introducing these extracts, and but little attempt to reduce the mass of opinions into a coherent statement of fact are features to be found with distressing frequency. It is creditable to give acknowledgment to writers on the subject, but when this is carried to the length of almost religious veneration for every passing statement, not always original or illuminating, the reader has a burden which he should not be asked to shoulder. The conciseness, unity, and balance that are the essential feature of a book as opposed to a systematic collection of printed abstracts are sadly lacking. Yet, as already pointed out, *Neuro-Ophthalmology* contains a vast amount of useful information not readily available. As a starting-point for anyone who wishes to follow up the literature on some clearly defined aspects of neuro-ophthalmology it can be recommended without reserve.

As a critical survey clarifying issues and hammering out broad principles in an important and ill-defined subject it leaves much to be desired.

COAL GAS, BENZPYRENE, AND CANCER

The Cause of Cancer. By David Brownlie, B.Sc. (Pp. 208. 7s. 6d. net.) London: Chapman and Hall. 1938.

The author of this book is a chemist with special knowledge of low-temperature carbonization. His thesis is very simple. Benzpyrene has been proved to possess carcinogenic properties; it is formed during destructive distillation of coal in the manufacture of coal gas; it is known to be present in coal tar and *may* be present in coal gas; *if* it is present in coal gas it *may* escape combustion and contaminate food cooked in gas-stoves and give rise to cancer among the urban population who live largely on food cooked in gas-stoves. After chapters devoted to inaccurate generalities and fallacious statistics the author proceeds on the assumption that benzpyrene is, in fact, present in coal gas and does escape combustion when gas is burnt, and that consequently benzpyrene causes cancer. Arguments as plausible and as silly could be brought forward to show that electric stoves cause cancer. Thus: ultra-violet radiations cause cancer; the electric stove may give off ultra-violet radiations; the use of electric stoves has increased during the last twenty years and cancer has also increased during the last twenty years; therefore electric stoves cause cancer.

It is surprising that a scientific man did not first of all determine definitely whether or not coal gas does contain benzpyrene, and if it does, whether or not the benzpyrene is destroyed when coal gas is burnt. The reviewer has had this point determined for him by chemists, and the answer is that coal gas does not contain benzpyrene, and that when benzpyrene is added artificially and the gas is burnt the benzpyrene is destroyed. The author of the book ought to have acquainted himself with the facts concerning benzpyrene as a carcinogenic agent; it is established beyond all doubt that application of benzpyrene to the skin causes skin cancer in some species of animals and injection subcutaneously causes sarcoma, but that ingestion of benzpyrene has no effect.

This book is likely to cause unnecessary fear and even alarm among the general population, already sufficiently oppressed by the dread of cancer.

Notes on Books

In his pamphlet *The Evolution of Chronic Rheumatism with Treatment to Correspond* (H. K. Lewis and Co., 2s. 6d.) Dr. R. FORTESCUE FOX makes a plea for a more rational treatment of this important condition. No one treatment is likely to be suitable at all stages of the disease, for the patient changes not only his manifestations but also his reactions to remedies in the course of years. Obviously prevention is better than cure, and for this purpose the author pleads for the establishment of clinics at which frigisensitive people can be trained to react against changes of temperature by means of contrast baths.

Dr. E. PILLET'S book *Analyse Physique des Calculs Urinaires et Biliaires* (Paris, Masson, 25 fr.) presents the results of an entirely new form of study in relation to pathological material. The methods of the science of crystallography have been applied to the elucidation of the structure of crystals and calculi. The outcome is an enrichment of our knowledge in regard to intimate detail, though the basic conclusions which have already been formulated using the cruder methods of proximate chemical analysis are not found to be in need of fundamental alteration. The volume is illustrated by a number of very striking photographs showing in minute detail the crystalline structure of various forms of calculi, both urinary and biliary.

Studien über die Prognose der Okkulten Kindertuberkulose, by Dr. GILLIS HERLITZ, is a reprint from *Acta Paediatrica,* Volume XIX, Supplementum II, and is published at Uppsala by Almqvist and Wiksell. The author of these studies on the prognosis of occult tuberculosis in children re-examined 1,457 children under 15 years of age, of whom about half had been Pirquet-positive and the other half negative, after a lapse of some ten to fifteen years. He concludes, as the result of his investigation, that a child who is tuberculin-positive but free from tuberculous disease beyond a primary complex—that is, a child suffering from occult, not manifest, tuberculosis—under normal conditions is more likely than a tuberculin-negative child of the same age to acquire a manifest tuberculous disease within the following ten to fifteen years, and to die from it. This increased danger continues for the child suffering from occult tuberculosis after it has reached adolescence. And so it is a greater disadvantage, at least for the first two to three decades of life, to have been infected with the tubercle bacillus in childhood than if the infection occurs later on.

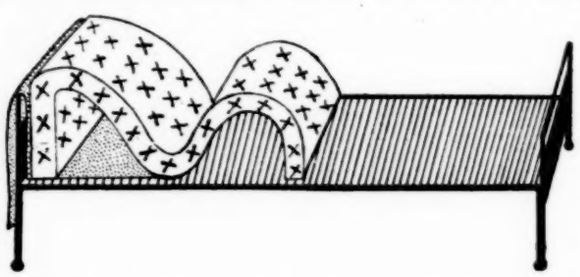
Reprints of papers on research work from the wards and laboratories of the London Hospital during 1937 have been bound together in paper covers and the volume is obtainable from Messrs. H. K. Lewis and Co. at 7s. 6d.

Preparations and Appliances

MATTRESS AND BLANKETS FOR FOWLER'S POSITION

Dr. CHARLES C. BREWIS (Mappowder, Dorset) writes: The accompanying rough sketch illustrates my idea of an easy, quick, and efficient way of obtaining and maintaining Fowler's position, so frequently required for the nursing of acute cases of many kinds. I can hardly hope that the idea is original, but I have not seen it used during my twenty-five years' experience, nor have the several doctors to whom I have explained it.

The mattress is arranged as illustrated and two blankets are used to keep it in position; one is laid the full length



of the bed and the second is partly draped over the head of the bed and partly laid over the first blanket. The second blanket is then drawn over the fold in the mattress at the head of the bed and the first blanket is turned back over the second fold in the mattress, thus helping it to keep its position. The first blanket is indicated in the sketch by the lined area and the second one by the stippled, or dotted, area. The cavities are filled with pillows or sandbags and the free end of the mattress can be prevented from slipping by the addition of a "biscuit," or, in fact, anything to make up the bed. Pillows can be arranged on either side as arm rests. The arrangement is a great improvement on the "donkey"; it is simple and it *works.*

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY JUNE 11 1938

RECREATION FOR THE WORKERS

The span from primitive magic to modern medicine covers not only a qualitative but a quantitative change. If it be true that environment exercises a profound effect on health through an almost bewildering range of physical and mental influences, then it becomes a problem to define the limits of medicine in a highly complex world. As each new development takes place we find convincing evidence that health is affected for better or for worse. If health is affected medicine is involved. Where does it end? Are we deploying our forces over too wide a field? There is a limit to the interests that each of us can embrace without loss of efficiency in regard to the hard core of medical practice—namely, alleviation of distress and assistance to the healing powers of Nature. But the limit is widely set and it must be admitted that few reach out fully to explore it. Those who do so find that the greater the mastery they acquire over fields of interest outside medicine the greater is their power to understand the forces that operate on their patients, the greater becomes their power to advise, and the more fully do they exercise the preventive and constructive sides of medicine. Disease must be cured, if possible; but, after all, disease is but the end-result of a chain of physiological failures. It is the doctor's duty to prevent those failures if he can. That the complex social and economic structure of our time makes the field a large one is no excuse for a failure to extend the frontiers of medicine to cope with the growing need. The challenge is out, and as a profession we accept it. If economic conditions affect food supplies, if social changes lead to increased rents, if industry uses more intricate solvents, we are thereby brought into contact with the basic causes of the problems we have to solve. Medicine as a force on the constructive side of social life has to study the causes of clinical phenomena even if it carries us back through emotional factors to the very roots of peace and war and to the basis of individual and national fitness to survive.

If "fitness" means anything it means this: the fitting of human beings to fulfil their lives in a manner consistent with the fullest physical and mental development that innate qualities allow. Further, we have to improve those innate qualities. Medicine has become a function of social biology. How can we escape this challenge to the highest effort that has ever been demanded of a single group? We cannot and we do not desire to. In the welter of new forces that are at present impingeing on society the doctor can no longer stand aside detached and concerned only with the care of the sick. He has a part to play in the evolution of new systems of living. In the *Supplements* of May 28 and June 4 Dr. Karl Haedenkamp has given us a glimpse of what the German doctor is doing. Dr. Haedenkamp remarks that the method must vary according to national characteristics, but he has said and implied enough to make us all reconsider our position *vis-à-vis* the State. For us it is a question of whether we will mould the system or allow the system to mould us. In the National Fitness Council this country has a nucleus for a constructive effort which may produce great things, and with the creation of a Medical Committee to advise it we hope the ground is now prepared for a drive in the advance of social medicine which could set in motion an urgently needed nation-wide scheme of constructive medicine to cope with the health aspects of the great trek that Western society has now embarked on. As an illustration, one of many which could be chosen, of the type of new interest medicine must embrace we can take the subject of recreation among the industrial population.

The Industrial Welfare Society has for many years advised employers to help in the creation of sports clubs for their employees. This sounds a simple and useful thing to do, but looking through the Society's new booklet[1] one is immediately aware of a new significance possessed by the results of its pioneer work. A channel has been made but water in quite inadequate volume flows down it. The main obstacle is lack of space and equipment for the development of recreational activities by all workers and not merely those employed by the firms who are enlightened or fortunate enough to be able to provide facilities. The multiplicity of interests and the encouragement of small voluntary societies for the pursuit of private ends are healthy both for the community and for the individual. It is to be hoped that this informative and well-thought-out booklet will give added encouragement; but when it comes to space and equipment it is surely a job for the National Fitness Council to see that, on a basis that all can afford, facilities are provided up and down the country, so that clubs can keep their identity, compete, and develop freely with the use of equipment and grounds well laid

[1] *Recreation in Industry: A Guide to Existing Facilities.* Industrial Welfare Society, 14, Hobart Place, Westminster, S.W.1. (1s. 2d. post free.)

out and economically maintained on a large scale by the community. In other words, let us have a public service of facilities for healthy recreation in its widest sense. It would be a capital investment yielding a self-supporting return from fees paid by private individuals or by clubs and societies formed within industry. The medical profession struggled hard to create such public utility undertakings as public sanitation and safe water supplies. It operates a vast health insurance scheme. It now reaches out to see whether it cannot enable bodies like the Industrial Welfare Society to increase their usefulness by the creation of self-supporting public undertakings in recreational facilities so designed that schools, universities, industry, and the general public would have the best return from an economically well-managed and well-laid-out series of centres where, among other things, the social mingling of different groups would be facilitated. We would press for Sunday opening, without which the scheme would be futile, and we would encourage all our men to play their games exposed to light and air, so that bronzed backs and pride of carriage should no longer be a Continental virtue.

This is one theme. There are many more. Unless, however, we as a profession are going to use our every endeavour to widen life and enrich health on its social side we shall let our influence slip away; and the rising generations, though they may seek our aid for the relief of pain, will cease to regard us as architects of health. The quack will flourish but true health decay. Moreover, the quest of a security for sound health lies at the root of violent political change. Change is good but violence is retrograde. Let us act in time and use our influence to effect with rapidity those developments which will minister to social welfare and progressive stability.

NATURE AND NURTURE: THE STUDY OF TWINS

"It is maintained by Helvetius and his set that an infant of genius is quite the same as any other infant, only that certain surprisingly favourable influences accompany him through life, especially through childhood, and expand him, while others lie close-folded and continue dunces. Herein, say they, consists the whole difference between an inspired Prophet and a double-barrelled Game-preserver; the inner man of the one has been fostered into generous development; that of the other, crushed down perhaps by vigour of animal digestion and the like, has exuded and evaporated, or at best sleeps now irresuscitably stagnant at the bottom of his stomach. 'With which opinion,' cries Teufelsdröckh, 'I should as soon agree as with this other, that an acorn might, by favourable or unfavourable influences of soil and climate, be nursed into a cabbage, or the cabbage-seed into an oak.' 'Nevertheless,' continues he, 'I too acknowledge the all-but omnipotence of early culture and nurture; thereby we have either a doddering dwarf bush, or a high-towering, wide-shadowing tree; either a sick yellow cabbage, or an edible, luxuriant green one.'"

In the century since those words were written Francis Galton and his prophet Karl Pearson spread the gospel of Eugenics, of the paramount importance of Nature, which found acceptance among an educated minority and has inspired some legislation. But even those rulers who, like the German dictator, pay the largest legislative tribute to the principle of genetic purity attach the greatest practical importance to early culture and nurture. The accurate delimitation of the parts played by heredity and environment is still an uncompleted task. Drs. Newman, Freeman, and Holzinger—a biologist, a psychologist, and a statistician—in a joint study of twins have made a valuable contribution to the subject.[1] The plan of the research which has been the task of ten years was this. In the first place fifty pairs of identical (monozygotic) and fifty pairs of fraternal (dizygotic) twins were to be studied. Here the members of the twin pairs were brought up together, so one could compare different correlates of genetic constitution under common environment. The subjects were physically measured in all appropriate ways and subjected to batteries of tests designed to explore the cognitive and conative sides of the psyche. In the second place, as the result of great pains and expense, nineteen pairs of identical twins were secured who had been separated early in life and brought up under different environmental conditions. These subjects were tested with the same minuteness as those of the first part of the research, and in each case a personal history and photograph are provided.

The results are set out with a wholly admirable modesty and precision. The statistical treatment is clear and not unduly technical; perhaps, even at the cost of lengthening the book, the general reader would have welcomed a full description of the educational and mental tests used, but these are of course available in many textbooks. It would be impossible to summarize adequately the findings in the space at our disposal. Perhaps this sentence from the general conclusions is the best attempt: "We feel in sympathy with Professor H. S. Jennings's dictum that what heredity can do environment can also do." But to leave it at that would create misconception. The evidence of the paramount importance of Nature (if under that term we include pre-natal environmental conditions) in creating differences when pairs under like environment are considered would have gratified such enthusiasts for "Nature" as Karl Pearson himself. From 75 to 90 per cent. of the difference variance

[1] *Twins: A Study of Heredity and Environment.* By Horatio H. Newman, Frank N. Freeman, and Karl J. Holzinger. Chicago: University of Chicago Press; Cambridge: Cambridge University Press. 18s.

is attributable to Nature for physical traits, and on the average three-quarters of the variance in intelligence also. But the study of separated twins brings out clearly enough the importance of environmental difference, particularly in the cognitive aspects of the mind. Intelligence, at any rate the manifestation of intelligence, is very susceptible to nurture. "From the viewpoint of the educator it is important to note that extreme differences in educational and social environments are accompanied by significant changes in intelligence and educational achievement as measured by our tests." We have some hesitation in quoting isolated passages; the authors are extremely careful reasoners and never lose sight of the difficulties of the work. They have risen wholly above the controversial plane on which Nature and nurture, heredity and environment, are set in opposition. Indeed Carlyle a century ago, or for that matter Francis Galton, did not make that mistake.

TREATMENT OF DISSEMINATED SCLEROSIS

Although disseminated sclerosis has been fully studied over many years in regard to its clinical symptomatology, pathology, and histology, the primary cause and essential nature of the disease remain obscure. From time to time different theories and methods of treatment have been suggested. Their multiplicity indicates all too clearly the insecure scientific foundation upon which they have been built and the baffling nature of the problem. At present attention is focused on Putnam's vascular theory of the disease, and this has led to renewed interest in Royle's method of treatment of the disease by section of the thoracic sympathetic trunk. Wetherell has reported eight cases treated in this manner, and in the present issue of this *Journal* Koch and de Savitsch have reported fifteen cases in ten of which varying degrees of improvement resulted from the operation of cervical dorsal sympathectomy. The essential feature in Putnam's theory is that the vascular changes found in the sclerotic plaque—namely, the acute thrombi and fibrosis of the vessel walls—are the primary pathological changes giving rise to the characteristic lesion in the surrounding nervous tissue. He bases this on his observation that experimentally produced venous obstruction can give rise to pathological changes very similar to those of disseminated sclerosis. The aetiological factor of the disease therefore lies either in an altered coagulability of the blood or in a local vascular abnormality. It is not by any means accepted that the vascular changes which Putnam has produced experimentally are identical with those of the sclerotic plaque, and he has not established the primary significance of the vascular abnormalities. It is doubtful, therefore, if a sound scientific basis for sympathectomy can be found in Putnam's work, and it is not known what effect this operation would have on the venous channels. Apart altogether from Putnam's work, sympathectomy may be beneficial for other reasons, and Wetherell rationalizes the procedure on the basis of an improved circulation and decreased sympathetic irritation of the cerebral blood vessels. Chemical factors, however, probably play a larger part than those of neural origin in the regulation of the cerebral blood vessels, so that it is not by any means certain that a large and prolonged increase of blood flow through the sclerotic plaque will result from sympathectomy. This may, however, be the case, but it is clear that this method of treatment must be justified in the present state of our knowledge only by the clinical results obtained, and those carrying out the treatment should be very careful in assessing the results. As the operation is one requiring considerable skill and experience it would seem only to be justified by the certainty that considerable improvement in the patient's condition is to be expected. A practical difficulty also arises in that the thoracic and lumbar part of the spinal cord cannot be considered to be denervated, as sympathetic fibres are still present along the radicular arteries. It seems clear at all events that patients with disseminated sclerosis can stand such an operative procedure without risk of aggravation of symptoms, and the further history of the cases already treated will be awaited with interest.

AETIOLOGY OF ICTERUS GRAVIS NEONATORUM

The symptomatology and familial association of icterus gravis neonatorum with hydrops foetalis universalis and congenital anaemia, and the frequent demonstration of erythroblastosis in these conditions, have formed the subject of numerous studies during the past few years. There has been no common agreement as to aetiology. Dr. Ruth R. Darrow[1] has now made an extensive survey of the views that have been advanced up to the present time. With regard to the familial association with congenital oedema on the one hand and congenital anaemia on the other, it is pointed out that a much more fulminating process is demonstrable pathologically in congenital oedema than in icterus gravis, but that there are definite points of similarity. Thus the liver and spleen are likely to be enlarged in both conditions; extramedullary haemopoiesis is commonly seen in both; and the placenta, which is much enlarged in hydrops, is sometimes slightly enlarged in icterus gravis. Similarly, there may be localized oedema in cases of icterus gravis and oedema in cases of jaundice, and anaemia may occur in either state. In one instance one twin showed oedema and the other developed icterus gravis. In the same way common factors and familial relationships are seen between icterus gravis and congenital anaemia. The author points out that any aetiological explanation must allow for the apparent absence of a hereditary factor, that normal children may be born before those affected, that the condition is often familial and the parents apparently healthy, that the pre-natal history seldom provides evidence of significant factors, and that any theory of causation must correlate the association of jaundice, oedema, and anaemia of the

[1] *Arch. Pathol.*, 1938, **25**, 378.

newborn, the clinical and post-mortem findings, and the erythroblastosis. The explanations advanced may be divided into those primarily implicating the mother and those in which the cause is sought solely within the child. Among the former nutritional disturbance due to defective maternal diet during pregnancy has been advanced to account for congenital anaemia but cannot be held responsible in many cases of icterus gravis, and in the same way maternal disease, particularly syphilis, can be excluded in most recorded cases. Toxaemia of pregnancy has been considered a cause by some authors, but again can only have been operative in a small proportion of cases. The views relating the condition primarily to the foetus are now generally based on the assumption that the jaundice is associated with an excessive destruction of erythrocytes, which is borne out by the observation of increased erythrophagocytosis and haemosiderosis in the liver and spleen. Gierke and others have regarded a primary constitutional anlage defect of the haemopoietic system as the most likely cause. The familial incidence is too large to make a Mendelian recessive character probable. Ruth Darrow considers the various possibilities of toxic action on the liver, and puts forward the hypothesis, as best explaining the facts, that passive sensitization to his own haemoglobin has been transferred to the foetus from the mother, primarily through the placenta during intrauterine life and subsequently by her milk.

BIO-ELECTRIC DETECTION OF CANCER

The search for a method of detecting cancer at an early stage never ceases, and efforts have lately been made to identify individuals susceptible to cancer. Recent work in this direction is recorded by Burr, Smith, and Strong[1] with the use of electrical methods the theoretical basis of which is by no means easy to grasp. Over a period of several years Burr has accumulated data from experiments on growth and regeneration in the nervous system, and "by integrating this data with Kappers's theory of neurobiotaxis, Ingvar's galvanotropism, and the studies of A. B. Mathews and E. T. Lund" he and Northrop[2,3] evolved an electrodynamic theory of life: according to this all living organisms possess a "steady-state" electrodynamic field, which imposes a characteristic pattern on the development of the organism. On this theory cancer should produce a change in the electrical pattern of the organism, and in the hope of detecting it the potential differences between various points were measured in mice from two of Strong's inbred strains. The axial potentials were higher in the strain which does not develop spontaneous cancer than in the one in which the incidence was high; the differences between the two strains were 10.7 times the probable error. Repeated measurements on young mice of the susceptible strain revealed an increase in the potentials across the chest shortly before tumours were palpable. The increase reached a maximum soon after tumours became palpable and disappeared in two to four weeks. In old mice there was no anticipatory rise, but a continuous rise from the appearance of the tumours until death; in mice of intermediate ages the results were irregular. The potential differences between tumours and normal tissues were rarely outside normal limits, and the measurements across the chest disclosed an effect of the tumour on the whole organism. Burr and his colleagues are hopeful that the method will eventually serve for the diagnosis of early cancer. It is harmless, and with the necessary machinery could be tested extensively on animals and man. The transitory character of the changes in some animals and the variation of the results with age are evident drawbacks in a diagnostic test. Indeed, when we read that "in general it may be said that in all probability potential differences in the organism are to some extent related to the age of the organism" we are persuaded that the position is not so clear as might appear at first glance.

[1] *Amer. J. Cancer*, 1938, **32**, 240.
[2] *Quart. Rev. Biol.*, 1935, **10**, 322.
[3] *Growth*, 1937, **1**, 78.

JOURNAL OF SOCIAL OPHTHALMOLOGY

The *Journal of Social Ophthalmology* is a new venture of the International Association for the Prevention of Blindness. There is a foreword by Mr. Bishop Harman, who states that blindness is one of the worst, perhaps the worst, of the physical disabilities of humanity. He also points out what an economic disability arises from blindness, both to the sufferer and also to the society or State of which he is a member; both by reason of the cost of the care of the blind person and of the wastage of effective labour. He maintains that it is more economical to spend money on the prevention of blindness than on the care of the blind. There follows a statement of the aims of the new journal by the editor, and an account of the proceeding of the general assembly of the International Association held in Egypt in December, 1937, at the same time as the fifteenth International Ophthalmological Congress. Two subjects were under discussion, and are here reported. The first was a national prevention of blindness programme in a tropical country, in which Mr. A. F. MacCallan (Great Britain), Dr. T. Sadek (Egypt), Dr. P. Toulant (N. Africa), Colonel Wright (India), and Professor Weve (Dutch E. Indies) took part. Stress was laid on the need for the effective control of trachoma. The second subject was the social aspect of the prevention of blindness, opened by Dr. Park Lewis of the U.S.A., who said, "Let us unite in fighting the common enemies, disease and poverty, and we shall no longer need to build up defences against each other." Dr. P. Bailliart of Paris showed what effective service could be got by associating social workers with the ophthalmological clinics established in the hospitals. The new journal is in no sense one of clinical ophthalmology. Its aim makes it an entirely new venture. It is issued with the one purpose of keeping the need for continuous social service before the minds of those upon whom the responsibility for the health of the several countries devolves. The first number is printed in English and French in parallel columns. As occasion suggests, other languages may be employed. The journal is sent free to subscribers to the Association, 66, Boulevard Saint-Michel, Paris.

EFFECT OF OESTRIN ON THE BASAL METABOLIC RATE

The generally beneficial and often spectacular effects of oestrin in the treatment of various menstrual and menopausal disorders have naturally resulted in its almost universal administration in these and allied conditions. With so little experimental evidence as a guide it is natural that dosage should be purely empirical, and that there should be the widest variations in the quantities prescribed for the same degree of deficiency. Further, though the general tendency of late has been to reduce the dosage to the original rather small amounts, many authorities believe these to be useless and advise the regular injection of quantities of from 10,000 to 1,000,000 units. There is a good deal of evidence for the symptomatic value of these larger doses, but the question of possible harmful effects has never yet been satisfactorily settled. The cancerogenic bogy has been fairly completely laid, but the possibility of other toxic sequels remains uncertain. To elucidate this problem Dr. Mary Collett and her co-workers[1] have studied the effect of the therapeutic administration of oestrin on the basal metabolic rate. They found that single intramuscular injections of 1,000 international units caused a fluctuation in the B.M.R. varying from minus 8 to plus 14 per cent. of the original level, with a greater and more lasting alteration following consecutive doses. In addition, the effects of oral administration persist longer than if equivalent amounts of the hormone are given by injection over a shorter period. These metabolic effects are interesting, for while reflex thyroid stimulation has been generally recognized few clinicians have appreciated its possible extent, and Dr. Collett's figures serve particularly to emphasize the importance of close metabolic observations when prescribing large doses of oestrin to patients suspected of incipient hyperthyroidism.

CONTROL OF MALARIA IN HONG KONG

The annual report for 1936 of the Director of Medical and Sanitary Services, Hong Kong, records an increase in the crude death rate from 22.9 to 26.6 per 1,000. As in previous years respiratory diseases were responsible for some 40 per cent. of the total deaths, a state of affairs attributable to overcrowding, poverty, and the expectorating habits of the population. It is stated that malaria, from which Hong Kong originally derived its reputation for unhealthiness, has now practically disappeared from the populous centres of Victoria and Kowloon. As a result of the work of the malariologist and his staff it is now known what species of anophelines exist in the colony, where they breed, and on what they feed. "The colony now possesses all the knowledge necessary to successfully combat malaria. Any particular area can be freed from the menace of mosquitos, and kept free, provided there be the power to act, the machinery to carry out the necessary measures, and the means to pay the cost." It is stated that the number of deaths attributable to malaria during the year under review was 503, giving a death rate of 0.5 per 1,000. This may be regarded as a remarkably low figure. The report records a severe epidemic of Shiga dysentery. The outbreak started in the month of November, when twelve European children developed symptoms so severe that seven of them subsequently died. Within eleven days there were forty-seven cases, all but four being European children under 10 years of age. The only further death, however, was that of a Chinese infant, the son of a servant employed in a house where two of the original victims of the outbreak had died. Investigation showed that the common causative factor appeared to be a special brand of high-grade milk. Although, however, the stools of 113 workers were examined, no Shiga bacilli were isolated from any of them, and it was impossible to incriminate a carrier.

[1] *Amer. J. Obstet. Gynec.*, 1937, **34**, 639.

COMMISSION OF PHARMACOPOEIAL EXPERTS

The Technical Commission of Pharmacopoeial Experts, appointed by the Council of the League of Nations at its meeting in January last, met at Geneva in May. The Commission's task was to prepare a programme of studies, choose suitable drugs for examination, and determine a uniform method of analysis, assay, and preparation of the drugs selected. The necessity for such work arises from the difficulties encountered by pharmacists in dispensing prescriptions for travellers from foreign countries and in the replenishment of medicine chests of ships at ports of call. Unification would, in addition, be of great advantage to manufacturers and would facilitate commerce in drugs between nations. Further, it would assist in the comparability of the results of medical treatment in different countries. The Commission prepared a list of the more important drugs which it proposed to study and codify. Draft schemes for the preparation of monographs on the drugs were agreed upon, and a number of general principles were settled. The list of drugs was divided amongst the members of the Commission for the purpose of study in collaboration with experts in their own countries.

PROFESSOR FREUD IN ENGLAND

Professor Sigmund Freud, accompanied by his wife and other members of his family, arrived in London on June 6 from Vienna, having travelled overnight from Paris. The Home Office has given him an unrestricted permit to live in this country, and he has taken up residence in a house in Elsworthy Road, Hampstead. Professor Freud, whose eighty-second birthday was on May 6, is visiting England for the first time for sixty-two years. His intention is to spend the remainder of his days here in study and research. The new German authorities in Austria have consented to allow his library and personal effects to be sent after him, but his publishing house in Vienna has been closed. Dr. Anna Freud, on behalf of her father, has denied rumours that he or any members of his family were under arrest in Vienna. The medical profession of Great Britain will feel proud that their country has offered an asylum to Professor Freud, and that he has chosen it as his new home.

SURGICAL PROCEDURES IN GENERAL PRACTICE

This is one of a series of articles contributed by invitation

TONSILLECTOMY

BY

LIONEL COLLEDGE, F.R.C.S.

The indications for tonsillectomy present a problem of daily occurrence varying widely with individual patients, and in practice we must sometimes depart from general rules laid down in academic discussions. Once the question of tonsillectomy has been raised in a particular case there is a tendency towards the view that it can do no harm and always does good by freeing the patient from a focus of sepsis, either actual or potential, and from attacks of tonsillitis, and therefore the sooner the operation is done the better. This doctrine may apply to many patients, but it is far from true in relation to children, to whom it has often been ruthlessly applied. A certain vagueness and difference of opinion on this point is inevitable in the absence of an exact knowledge of the physiology and functional activity of the tonsil in childhood, although various unproved theories have been advanced, but clinical study provides some practical information.

When to Perform Tonsillectomy

Frequently, if not normally, the tonsils in the early years of childhood become enlarged, and this enlargement has been regarded as an indication, with more right as a justification, for removing them. It should in fact be considered primarily as an indication for preserving them, unless the enlargement is so great as to produce mechanically obstructive symptoms, which is quite rare. The nature of the needs in response to which the enlargement occurs is unknown, but these needs are probably nutritional or arise from some defect in nutrition, which will be revealed by research; for it is much commoner in children brought up in poor circumstances than in those for whom an abundant supply of suitable food, fresh air, and light is available. If this hypothesis is correct tonsillar enlargement in early childhood is compensatory in character, and should be treated by improvement in hygiene rather than by extirpation, and this view has the practical support of the observation that recurrence by enlargement of the lingual tonsil and adenoid tissue in the nasopharynx is a common post-operative sequel. It is therefore wise, unless urgent indications are present—and this is rare—to defer any operation until at least the age of 5 and preferably until 7 or even later. It must also be made clear what advantage the child gains if the operation is performed between the ages of 4 and 10 years. Kaiser studied this question in two large groups of children, using one as a control.

Two groups, each comprising 2,200 children, were observed over a period of ten years. In one group the operation of tonsillectomy was performed, and in the other it was recommended but not performed. The benefits obtained in the first three years became less conspicuous in later years, so that the clinical condition of the members in the two groups became more alike. Thus the immediate freedom from sore throats was not maintained, and seven years later 10 per cent. in the first group were found to be still subject to them. The incidence of rheumatic fever proved to be 33 per cent. less in those children whose tonsils had been removed, but the operation has no influence in preventing recurrent attacks of rheumatism when performed after the initial attack. It does not protect against rheumatic carditis, nor does it affect the incidence of chorea. It gives some slight protection against scarlet fever, but reduces its incidence by less than 50 per cent. The influence of tonsillectomy on the incidence of diphtheria is more pronounced. Consequently, in recommending the operation on relative indications certain benefits to the child may be legitimately claimed, but these can be easily exaggerated.

Frequently recurring sore throats and enlargement of the cervical lymphatic glands are absolute indications for tonsillectomy in children. Nasal obstruction and otorrhoea in the absence of caries of the middle ear are indications for the removal of adenoids but not necessarily of tonsils, and in small children preservation of the latter is the best guarantee against recurrence of adenoids. In bigger children, in whom the physiological need for lymphoid tissue is diminishing, it is customary to combine the two operations, and this usually gives a satisfactory result without great risk of recurrence.

In older persons the tonsils may be removed on account of recurrent sore throats or quinsies, on account of persistent enlargement or infection in a tonsil which has been the site of tonsillitis, or to eliminate a source of focal sepsis which is causing remote symptoms such as rheumatism, arthritis, neuritis, iritis, cardiac irregularities, and digestive disorders. In the first group the indication is an absolute one provided that no general contraindication to surgical intervention is present; in the second group the indication is relative, and a reasonable connexion must be established before recommending tonsillectomy, but in well-chosen cases the elimination of a septic focus has a strikingly beneficial effect on a remote lesion. The age of the patient is not of much consequence provided that definite indications are present, and tonsillectomy is sometimes of great benefit to old people; but in the absence of clearly defined indications the result is apt to be disappointing in elderly persons.

Before recommending tonsillectomy for focal sepsis it is necessary to demonstrate that the tonsils are grossly infected, and this is not always quite simple, because in such cases the tonsils are often small, are concealed by the faucial pillars, and at first glance may appear to be absent. Two small tongue depressors should be used; with one of these the back of the tongue is depressed, and with the other the anterior pillar is pressed aside, exposing the underlying tonsil. By this manœuvre a gush of sour foul-smelling pus can often be expressed from the crypta magna or supratonsillar fossa. A crimson patch on the anterior pillar is an indication of this condition underneath.

Technique

In the matter of technique a variety of different opinions and details of procedure are current in the operation for removal of the tonsils. In children it may be done with the guillotine or by dissection, but it is a good general rule not to use the guillotine after the age of 15, and many surgeons now prefer the operation by dissection for patients of all ages. The soft friable tonsils, which tear readily, are more easily removed with the guillotine than

by dissection. The guillotine method has also the advantage of rapidity, but some practice is necessary to acquire sufficient dexterity. Compared with the dissection method, however, it has the disadvantage that, the deep surface of the tonsil not always being smooth, an outlying part projecting through the capsule may be shaved off and remain in the tonsil bed; and, again, occasionally a vein in the tonsil bed is buttonholed and, being unable to retract, continues to bleed through the lateral opening. That portions of tonsil are sometimes left behind after the guillotine operation, if not skilfully performed, is insufficient ground to condemn it, because the same thing may occur after dissection.

Whichever method is employed the aim of the operator should be to remove the whole tonsil without injury to the faucial pillars or to the palate. Healing then takes

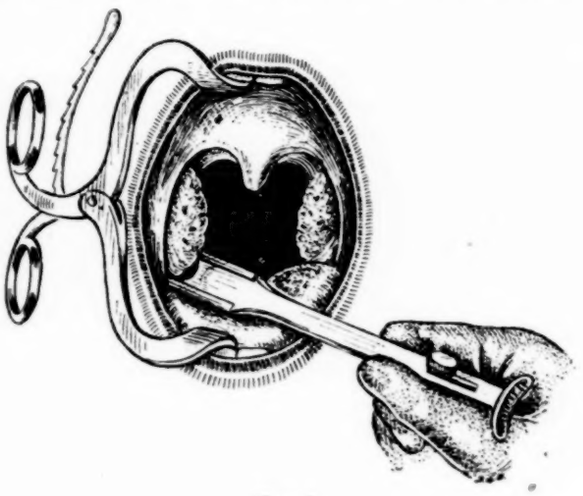


FIG 1.

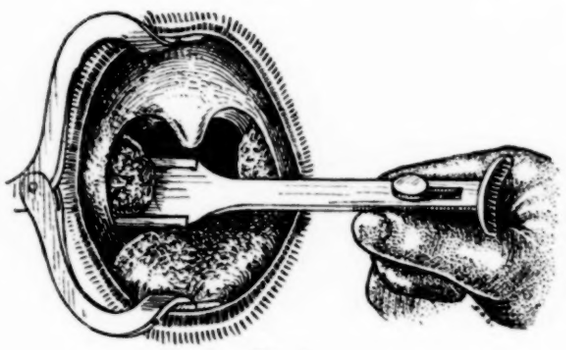


FIG. 2.

place with the minimum of scar tissue and distortion. If the uvula is accidentally included in the ring of the guillotine or the pillars are torn during dissection, gross deformity of the fauces and soft palate may be produced.

Enucleation by the Guillotine

The operation can be performed under a short anaesthetic with ethyl chloride, but a more deliberate procedure under ether is preferable. The patient lies on the back with the shoulder slightly raised on a low pillow or a folded towel. The anaesthetist stands at the head of the table, and the operator on the right-hand side of the patient. The mouth is opened with a Doyen's gag, but not so widely as to stretch the pillars of the fauces. The tongue is depressed and the ring of the guillotine passed under the lower pole of the right tonsil, with the handle of the instrument pointing to the left of the patient (Fig. 1). The hand is now depressed so that the tonsil is levered forward by the instrument on to the alveolar eminence of the mandible (Fig. 2). This eminence is formed by the projection of the last molar tooth at the end of the mylohyoid ridge. The handle of the instrument now lies across the left cheek of the patient. The left forefinger is then removed from the corner of the mouth and pressed against the anterior faucial pillar, so that the entire tonsil is gently pushed through the ring of the guillotine (Fig. 3). The tonsil can be felt to slip through the ring, and the blade is then closed by the thumb of the right hand, with the cutting edge between the anterior pillar and the tonsil. The hand is now pronated and the tonsil lifted out, held on the lower surface of the guillotine (Fig. 4). To remove the left tonsil the hands must be used in the reverse way, the guillotine being held in the left hand, or, alternatively, the operator must move to the head of the table and stand behind the patient. In this way the tonsil is removed complete, including the supratonsillar fossa.

The smallest guillotine which will allow the entire tonsil to pass through the ring should be used, and the blade

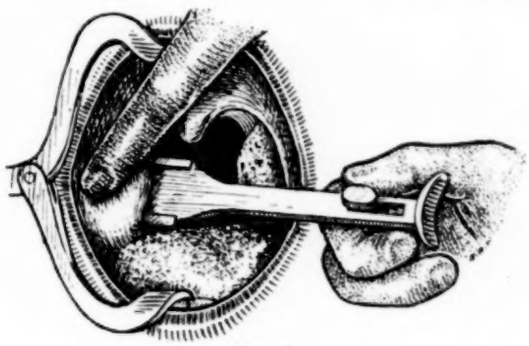


FIG. 3.

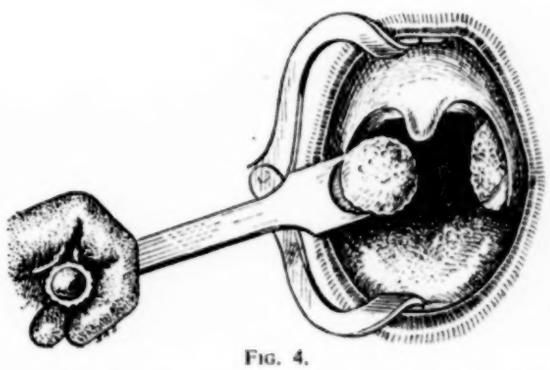


FIG. 4.

should be slightly blunted so that it will follow the line between the capsule of the tonsil and the side of the pharynx without cutting into the substance of the tonsil. The blade also crushes the blood vessels supplying the tonsil, but must not be too blunt, otherwise that organ is torn out of its bed instead of being cut away.

Enucleation by Dissection

For the operation by dissection either a local or a general anaesthetic may be used, but the former is only suitable for adults. For local anaesthesia the patient is placed in the sitting position and a little 5 per cent. cocaine is applied to the fauces. An injection of 2 per cent. novocain with 1 in 10,000 adrenaline is then made with a long needle in five spots in the fauces around each tonsil—one above, two behind, and two in front. If general anaesthesia is employed the patient is usually

placed on the back with the head well extended, so that blood runs down into the nasopharynx. The mouth is opened with a Doyen gag and the tongue drawn forward; or a Davis gag, which holds down the back of the tongue

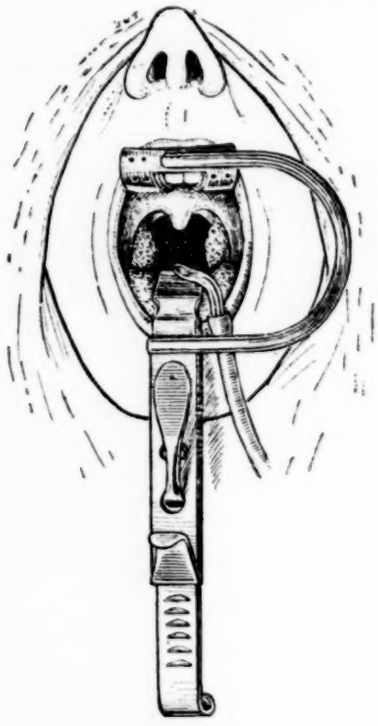


FIG. 5.

and at the same time draws it forward, may be used (Fig. 5). The latter gag is popular and is much employed; but it is complicated and easily put out of order, and is not necessary. It is quite as satisfactory to use the position recommended by Butlin, in which the patient is turned on to the right shoulder. With the mouth gagged open and the tongue drawn forwards, blood collects in the cheek and runs out of the corner of the mouth.

Intratracheal anaesthesia with gas-oxygen and ether is often employed; but it causes increased bleeding, though it has the advantage that the entrance to the larynx can be packed off round the intratracheal tube. Preliminary medication with avertin, paraldehyde, or barbiturate compounds is also often used, with the object of allaying the apprehensions of the patient, but much post-operative anxiety is thus caused, and it lacks any real justification even for a nervous subject. Simple general anaesthesia by inhalation and insufflation is the safest and most satisfactory method. The operator either sits at the head of the table or stands on the right-hand side, according to the patient's position, and he should wear a head-light. The tonsil is seized with forceps and the mucous membrane divided at its reflection from the anterior pillar or to the tonsil. The mucous membrane is thus divided well behind the free edge of the pillar, which is kept covered with an intact surface of mucous membrane. This opening can be made with the point of a knife or closed fine dissecting forceps, and the white smooth capsule of the tonsil is exposed, showing that the dissection is proceeding in the right layer (Fig. 6). If there has been a previous operation the tonsil is often surrounded by an annular scar, and the anterior pillar must be picked up and the incision made underneath it to expose the capsule before the tonsil can be grasped: this is a satisfactory routine method of beginning the dissection. By blunt dissection close to the capsule with long-handled scissors and dissecting forceps the tonsil is then shelled out of its bed, the mucous membrane being divided all round the periphery (Fig. 7). The lower pole is often well defined, but in many cases it merges into the lingual tonsil and must be divided with scissors (Fig. 8)—a more satisfactory method than the use of a snare, as the division can be made with greater precision, without the risk of leaving a part of the lower pole behind. The tonsil is not in direct relation to the superior constrictor of the pharynx, but is separated from it by the palatopharyngeus. This muscle spreads out, sending a slip that is attached to the capsule of the tonsil just below the middle, and accounts for the frequency with which muscle fibres are found on the capsule of excised tonsils.

The blood vessels torn across by the blunt dissection stop bleeding quickly as a rule if gauze swabs are applied, or, if this fails, pledgets of cotton-wool often succeed. Any persistent bleeding usually comes from a vessel about the middle of the tonsil bed, less commonly at the lower end near the tongue.

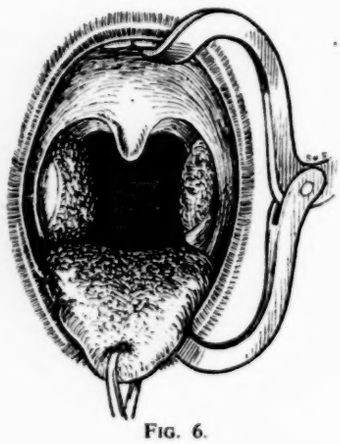


FIG. 6.

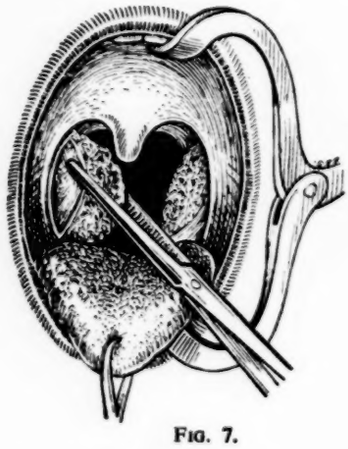


FIG. 7.

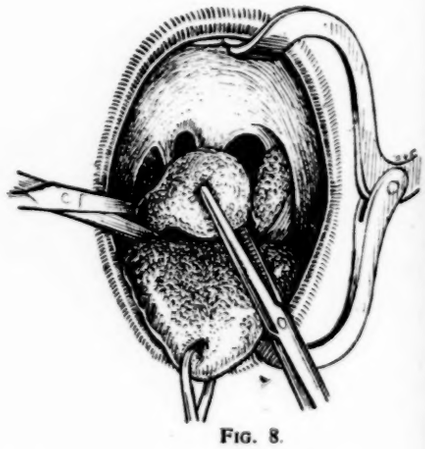


FIG. 8.

Many instruments have been devised to apply ligatures to bleeding-points. The simplest and most certain method is to pick up the bleeding vessel with long forceps and to underrun and tie it with a silk ligature on a Reverdin needle. This leaves the faucial pillars quite intact. In the few cases where this fails the Reverdin needle can be used to transfix and suture the pillars together with silk threads. This obliterates the raw tonsil bed; but it causes scarring, and the sutures should be divided on the following day.

If reactionary haemorrhage occurs within the first twelve hours and does not cease very quickly it is better to give the patient a second anaesthetic and secure the bleeding-point. Secondary haemorrhage occasionally appears about the sixth day after the operation, when the slough which forms over the raw surface separates. This seldom causes any serious trouble, but to avoid it the patient should remain quiet, wherever the operation is done, until the seventh or eighth day.

Adenoids

When adenoids require removal at the same operation it is usual to do this after the tonsillectomy has been completed. The palate is drawn forwards with a finger or with a palate retractor; the adenoid curette is inserted into the nasopharynx until the beak touches the vomer and is then swept firmly round, following the curve of the nasopharyngeal vault. After the operation the patient should be watched carefully for any reactionary bleeding, as this may be concealed if the blood is swallowed instead of ejected. Powdered aspirin or aspirin gargle usually suffices to relieve pain, but for adults an injection of morphine is permissible on the evening after the operation. Cold soft food may be taken the following day: ice-cream is welcomed by children. A purge is usually indicated within the first forty-eight hours to rid the bowel of swallowed blood. Cascara is suitable, but salines should be avoided as they are very painful to swallow.

After-treatment

A rare but tiresome complication is temporary paresis of the soft palate due to infiltration and swelling of the muscles. This causes difficulty in swallowing, and regurgitation, particularly of fluids, through the nose, which may last for about ten days. Some additional care is then necessary in the choice of suitable soft food, such as scrambled eggs, porridge with cream, or mashed potatoes; meat, toast, biscuits, and cheese are particularly difficult to swallow in this condition, and are accordingly to be avoided. The difficulty in taking fluid may be overcome to some extent by suction through a tube or a straw.

ANTI-VENEREAL MEASURES IN SCANDINAVIA

COMMISSION'S REPORT

Should venereal disease be dealt with compulsorily in this country or not? This question was raised before the Trevethin Committee in 1923, in Parliament by the Edinburgh Corporation in 1928, and on a number of other occasions by various bodies and individuals. Many arguments have been put forward for and against such a policy, and with a view to obtaining some definite evidence of its value or otherwise the British Social Hygiene Council in June, 1936, urged the Minister of Health to send a commission of experts to Denmark, Sweden, Norway, and Holland to study conditions in these countries. The commission, which consisted of Colonel L. W. Harrison and Mr. Dudley C. L. Ward of the Ministry of Health, Dr. T. Ferguson of the Department of Health for Scotland, and Dr. Margaret Rorke of the Royal Free Hospital, London, has just issued its report.*

For and Against Compulsion

Before considering this report it may be instructive to consider some of the arguments which have been advanced for and against a policy of compulsory treatment. Those in favour of such a policy point out that (1) many persons infected with venereal disease in a contagious form never come under medical care and thereby spread infection (these are chiefly women); (2) large numbers of patients at V.D. clinics default before they have completed treatment and/or become non-contagious; and (3) parents frequently fail, through ignorance or unwillingness, to have their congenitally syphilitic children treated adequately, and therefore prejudice their chances of growing up to become healthy and useful citizens.

Those against point out that compulsory measures (1) may induce the infected to conceal their disease from fear of exposure; (2) are not easy to apply in such a densely populated country as this on account of the difficulty of tracing those who try to avoid the law; (3) may open the way to blackmail; and (4) are not consonant with the British idea of the liberty of the subject.

The Trevethin Committee appear to have considered legislation impracticable and inadvisable, and the Edinburgh Corporation Bill was defeated in the House of Commons on its second reading by 156 votes to 93, so that it would seem that general opinion in this country is against compulsory treatment. On the other hand, there are those who point to the remarkably low incidence of syphilis in those countries which have adopted compulsion. In order to form an opinion as to how far conditions are comparable between the countries mentioned and Great Britain it may be useful to consider each country in turn.

Denmark

Denmark has an area of 16,575 square miles and a population of 3,706,349, giving a density of 224 per square mile, which is about one-third of that of England and Wales. Copenhagen has a population of 666,269, and of the eighty-five provincial towns only two have a population of more than 50,000, fifty-seven having less than 10,000. The population is therefore much more rural than in this country, but ports are numerous and communication by sea very free; the former is admitted to lead to a low incidence of venereal disease while the latter allows of its importation.

The standards of education and intelligence of the population are high, and public health administration is advanced; medical education is thorough and occupies a minimum of seven years; a "specialist" has to spend several years more studying his own and other subjects. The result is that the medical profession has a very high standing and patients attach much weight to the opinions of their doctors.

Legislation for the control of venereal diseases dates back to 1774, and at the present time the law of 1906 is in force. Under this every person suffering from a venereal disease is entitled to free treatment but is obliged to submit to it; concealment and conveying of infection are punishable by imprisonment up to four years; doctors must make a return of their cases, though notification of individual cases is not necessary; defaulters may be punished and compelled to attend for treatment, if necessary by the police; a certificate of freedom from venereal disease is required for marriage, and if either party at the time of consummation was suffering from a venereal disease in a communicable form a judicial separation or a divorce may be obtained.

TREATMENT AND INCIDENCE

Free treatment is available for all; there are seven centres in Copenhagen, and in most other places treatment is carried out by district health officers or specially authorized local practitioners; ample bed accommodation is provided. The cost is about one million kroner† per annum. Serum tests for the whole country are carried out at the State Serum Institute and by this means there has been established a unique institution for the statistical study of syphilitic infection; some 110,000 blood samples are received each year.

It is considered that very few persons evade the law of compulsory treatment. The police have rarely to be called

* *Anti-Venereal Measures in Certain Scandinavian Countries and Holland.* Reports on Public Health and Medical Subjects. No. 83. H.M. Stationery Office. (2s. 6d.) A general article on the Commission's visit to Scandinavia appeared in the *Journal* of June 4.

† About £45,000 per annum.

in, and false certificates by unscrupulous doctors are almost unknown.

The incidence of venereal disease is not easy to ascertain—though it is well known that there has been a substantial reduction during recent years—owing to the fact that reports do not distinguish between fresh and old infections. After reviewing all the facts the commission came to the conclusion that in 1936 new infections with syphilis were about 600 per annum, or 1.6 per 10,000 of the population for the whole country, and about 6 per 10,000 for Copenhagen alone. These figures may be compared with 14 and 52 in 1919, and 7 and 26 in 1926. There has been no comparable reduction in the incidence of gonorrhoea; the rate for Copenhagen fell from 159 in 1919 to 76 in 1936, while for the whole country the rates were 48 and 28 respectively; on the other hand, the rate for the whole country was approximately the same in 1936 as it was in 1906, though during this period it had fallen from 112 to 76 in Copenhagen alone.

Sweden

Sweden has an area of 173,547 square miles and a population of 6,249,489, with a density of 39.5 per square mile—about one-eighteenth of that of England and Wales. There are only forty towns with a population over 10,000, but sea communications are very free. Standards of education, both lay and medical, are high and comparable with those of Denmark.

In the eighteenth century the west coast was one of the principal sources of venereal infection, and since 1787 various measures have been drafted to combat this. In January, 1919, the "*lex veneris*" came into force. This makes treatment compulsory till the patient is non-infectious; free treatment is available for all; cases must be reported, but not by name; transmission of infection is punishable by imprisonment; marriage certificates are necessary; defaulters are reported, sought out, and, if necessary, compulsorily removed to hospital; and the treatment of venereal disease by unqualified persons is prohibited. Treatment facilities are available in policlinics in all towns with a population of 20,000 or over; in the country treatment is carried out by municipal and rural district medical officers employed by the State. The cost is about 550,000 kronor‡ per annum.

The Swede is very amenable to the law, and few patients require coercion. It is computed that less than 10 per cent. of cases have to be reported as defaulters, and of these only 20 to 25 per cent. cannot be traced, though on the other hand a considerable proportion of sources of infection (in 1934 107 out of 175) cannot be found. The incidence of syphilis in all Sweden was 10.2 per 10,000 in 1919, 1.2 in 1925, and 0.67 in 1935, the corresponding rates for Stockholm being 44, 4.6, and 1.8 respectively. As regards gonorrhoea in Stockholm the maximum of 203.7 per 10,000 in 1918 fell to half this figure in 1922 and to 65.0 in 1935; for the whole country the figures were 28, 18, and 18 respectively.

Norway

Norway has an area of 124,588 square miles and a population of 2,881,514, with a density of about 23 per square mile; about 69 per cent. of the population is rural. Oslo (253,124) is the only town with a population over 100,000, and there are eighteen principal towns. Communication by sea is very free, but otherwise geographical and social conditions favour a low incidence of venereal disease. Education is of the same high standard as in Denmark and Sweden.

As regards legislation venereal diseases are dealt with under the laws relating to all infectious diseases, principally those of 1860 and 1927. Under these a doctor must report cases to the local health officer and furnish a summary of all cases every year, and patients suffering from a venereal disease must submit to treatment in hospital if required to do so; licensed houses were abolished in 1880. Persons knowing themselves to be suffering from a contagious disease render themselves liable to imprisonment if they expose others to infection, and it is illegal to place a syphilitic child under the care of another person, or to enter a household as domestic servant in similar circumstances. Marriage is also barred whilst a person is contagious. Further measures were contemplated in 1923, such as free examination and treatment, compulsory treatment, and compulsory notification, all at the expense of the State, but these were not adopted; however, merchant seamen are treated free, and free arsphenamine is to be supplied.

Under present conditions "indigent" persons may obtain free treatment, and syphilis and gonorrhoea come within the scope of the compulsory health insurance scheme; otherwise the patient must bear the cost. The peak of the incidence of syphilis in Oslo occurred in 1919, when the rate was 36.2 per 10,000; this fell to 19.5 in 1926 and to 7.5 in 1935, though it was only half this in 1934; for the whole country the figures were 6.6 in 1919, 3.7 in 1926, and 1.6 in 1935. As regards gonorrhoea, Oslo showed a rate of 77 per 10,000 population in 1919, rising to over 110 in 1927 and falling to 67 in 1935; the corresponding rates for all Norway were 22, 25, and 19 respectively.

Holland

Holland has an area of 12,692 square miles and a population of 8,474,506, giving a density of 667.7 per square mile. It has three towns with populations of over 400,000, and sixteen other large towns. It is therefore much more densely populated than Denmark, Norway, or Sweden, and this fact, together with its heavy traffic by sea or river, would be expected to render it more vulnerable to venereal infection. The standard of general education is high and the medical curriculum lasts for a minimum of seven years. The arrangements for the control of venereal disease depend largely on voluntary effort; free treatment, except for merchant seamen, is not provided; there is no notification or compulsory treatment and prostitution is not State-regulated. A system of social service has, however, been set up in nine of the eleven provinces under the auspices of the Green Cross, White Cross, and White-Yellow Cross Societies, subsidized to some extent by the Ministry of Health. In the circumstances no statistics are available, but some figures have been collected relating to the year 1935. The incidence of syphilis is stated to be 1.06 and of gonorrhoea 5.6 per 10,000 of population; the former figure is probably near the mark, but the latter too low.

Conclusion

The Commission found that, in general, compulsory measures do not meet with serious opposition; the general public is co-operative, and extreme measures are seldom necessary. In the Scandinavian countries certain factors prevail which make for the smooth working of anti-venereal disease measures. These are briefly: (1) homogeneous populations; (2) a high sense of communal responsibility; (3) implicit trust in a highly trained medical profession largely State-paid; (4) uniformity of medical practice; and (5) the venereal diseases are not looked upon as shameful. Notification appears to be efficient in Sweden, incomplete in Denmark, and even more so in Norway.

The effects of anti-venereal measures on fresh syphilis have been very great in both Denmark and Sweden where treatment is compulsory, but the fact that in Holland and England and Wales, where reliance is placed mainly on persuasion, they have been almost equally successful makes it doubtful whether this is due directly to compulsion. As regards fresh gonorrhoea the same seems to hold, since Sweden and Denmark, where compulsory treatment is in force, show rates of 17.9 and 27 per 10,000, as against 8.7 for England and Wales and 5.6 for Holland, where treatment is voluntary, even though the last two figures are probably on the low side.

As a result of its inquiries the Commission came to the conclusion that compulsion did not lead to the concealment of disease in Denmark and Sweden, mainly on account of national characteristics; on the other hand, Holland and England and Wales were able to show almost equally good results in reducing the incidence of syphilis.

‡ About £27,500 per annum.

None of the five countries can point to any great success in reducing the incidence of gonorrhoea, and the explanation for this is not altogether clear. It would appear that syphilis is more easily and more quickly rendered non-contagious, while it is probable that the general public regards it as a much more serious disease than gonorrhoea and therefore is more anxious to secure treatment.

The main desiderata for an anti-venereal diseases campaign therefore appear to be adequate facilities for free treatment for all, an enlightened law-abiding public, and the removal of the odium attached to these diseases. The comparative failure in the campaign against gonorrhoea suggests that much more research—and the necessary funds for carrying this out—is required before a reduction comparable with that in syphilis is likely to be obtained, though treatment by sulphanilamide holds out some hope of success.

NATIONAL INSURANCE IN AUSTRALIA

Last week the Australian House of Representatives passed the second reading of "A Bill for an Act to provide for insurance against certain contingencies affecting employees, and the wives, children, widows, and orphans of employees, and for other purposes." The complete text of the Bill has only now come to hand in England, and its provisions are described in the present article. In the course of the debate in the House of Representatives the Australian Government announced that it was prepared to make some extensions of the Bill, and made certain statements as to its action thereunder. The most important of these will be given after the proposals as set out in the Bill have been described: but any comment upon these and other controversial points and upon the reaction to these proposals of the medical profession in Australia may be more conveniently reserved until fuller details have reached this country.

Scope of the Bill

The Bill deals both with national health insurance and with pensions. It does not touch the subject of unemployment insurance, but Mr. Lyons, the Prime Minister, announced that a measure with regard to this would be introduced, though he could not say at what date this would be. On the other two matters it is known that the Federal Government has been making wide and careful inquiry for at least two years past and that it has had very material help in such inquiry from the Ministry of Health in London. It is not surprising, therefore, to find that the provisions of the Bill in general follow with some closeness those embodied in similar legislation in Great Britain; nor that the Bill is a long and complicated one, and contains a number of clauses the exact significance of which it is not easy to determine and which, indeed, must be largely conditioned by the terms of rules and regulations that will be made hereafter. There are 188 sections and four schedules.

After an important clause of "definitions," the Bill provides that there shall be set up a National Insurance Commission consisting of three commissioners appointed by the Governor-General; but there is to be a deputy commissioner for each State, who shall have such powers and functions as the Commission directs. Moreover, the Commission may delegate any of its powers and functions "in relation to any matters or class of matters, or to any particular State or part of the Commonwealth, so that the delegated powers and functions may be exercised by the delegate with reference to the matters or class of matters specified or the State or part of the Commonwealth specified in the instrument of delegation." These powers of delegation and the functions assigned to a deputy commissioner are very important, for the respective spheres of the Commonwealth and of the several States may possibly give rise to difficulty or dispute. It is understood that the States have control of health legislation and administration within their own areas, and that it is only because the present Bill is regarded as insurance legislation that it becomes a Federal matter. In such a wide and intricate service as is proposed the spirit in which it is administered and its general uniformity of administration are of the first importance, and it is possible that the subsection which says that "every delegation by the Commission shall be revocable in writing at will" may not prove unnecessary.

Aboriginal natives of Australia or of the Pacific Islands are not included in the scheme at all. The persons to be insured are of four classes: (1) all employed persons (with certain exceptions on much the same lines as in Great Britain) between the age of 16 years and the age of 65 if men and 60 if women; (2) voluntary contributors below these maximum ages who have been insured as employed contributors for two years and who have ceased to be employed; (3) juvenile contributors, employed persons between 14 and 16 years of age, insured for medical benefit only; (4) special voluntary contributors, married women previously insured for not less than five years who may elect to contribute for old age pension only. Except for this special provision, a married woman who is not insured by virtue of her own insurable employment does not come within the scheme at all. With regard to medical benefit, a voluntary contributor whose total income from all sources exceeds £365 a year is not entitled thereto. On the other hand, an insured person who is so entitled and who attains the maximum age or becomes entitled to receive an old age pension remains entitled to medical benefit during the remainder of his life. Persons employed otherwise than by way of manual labour whose rate of remuneration exceeds £365 a year are not included as insured persons.

Payment of Contributions

The amounts of the weekly contributions to be paid are as follows: (1) By and in respect of employed contributors and by voluntary contributors entitled to medical benefit—1s. 3d. in respect of health insurance and 1s. 9d. for the pensions fund for males, 1s. 2d. and 10d. respectively for females. (2) By voluntary contributors not entitled to medical benefit, males 11d. and 1s. 9d.; females, 10d. and 10d. (3) Special voluntary contributors 1s. All voluntary contributors pay themselves the whole of the contribution. Employers pay a portion of the contribution in respect of their employees, but the proportion imposed upon them is not stated; nor is the amount to be paid by and in respect of juvenile contributors stated, but the whole of this contribution goes to the Health Insurance Fund. Presumably these unspecified amounts are to be determined from time to time under a section which states: "Contributions at the rates declared by the Parliament shall be levied and paid by the persons by whom the contributions are so declared to be payable." The employer is made responsible for paying the contribution in the first instance, but he may recover the employee's share by deduction from his wages or other remuneration. The rates of contribution of voluntary contributors are to be increased by sixpence a week after five years and by a further sixpence, in the case of males only, after a further five years—that is, from the year 1949. The method of payment is by stamps affixed to cards or books, or "in such other manner as is prescribed."

The benefits are enumerated thus: medical, sickness, disablement, additional, old-age pension, widow's pension, orphan's pension, dependent child's allowance. There is an important provision that where the Commission has certified that "on account of remoteness or any other circumstance related to the locality or nature of any employment the effective administration of any benefits which are specified in the certificate is impracticable" the insurance shall be only for benefits other than those specified. Provision is also made for certain "free insurance periods" corresponding to those in the system in Great Britain.

Medical Benefit

Medical benefit is defined in almost the exact terms of the English Acts. It comprises general medical practitioner and pharmacist services only, and includes certification. The Commission will make arrangements and enter into contracts or agreements for these services, and regional medical lists will be published. Every registered medical practitioner has the right to have his name included, and there is to be free choice by both doctor and patient within the usual limits. However, if the Commission is satisfied that in any State or district such an arrangement is unsatisfactory or inadequate it may make such other arrangement for the supply of the services as it thinks fit. There is to be set up a central medical benefit council consisting of persons representing medical practitioners, pharmacists, employers, and insured persons, and others selected by the Minister in charge of the service. This council is to give advice to the Commission with respect to any matter relating to medical benefit referred to it and will have such other powers and duties as are prescribed. District medical benefit committees are also to be established, with "such powers and duties in relation to complaints by insured persons, medical practitioners, pharmaceutical chemists, and approved societies in connexion with medical benefit in the district for which it is appointed" as may be prescribed by regulations. If representative committees of medical practitioners and of pharmacists respectively are constituted they may be recognized by the Commission and appropriately used. Any relevant representations made by such committees must be considered by the Commission.

Cash Benefits and Finance

With regard to the cash benefits, to be administered mainly by approved societies as in Great Britain, the weekly rates of pay are thus set out: (1) Sickness benefit: (*a*) adults and married minors, males 20s., females 15s.; (*b*) unmarried minors insured for two years, males 15s., females 12s. 6d.; (*c*) unmarried minors insured for a less period, males 12s., females 10s. (2) Disablement benefit: (*a*) adults and married minors, males 15s., females 12s. 6d.; (*b*) unmarried minors, males 12s., females 10s. (3) Old age pension: males 20s., females 15s. (4) Widow's pension 12s. 6d., later 15s. (5) Orphan's pension 7s. 6d. (6) Dependent child's allowance 3s. 6d. Sickness benefit, however, commences only on the seventh day of incapacity and not until six months after entry into insurance. The incidental provisions regarding sickness and disablement benefits are much the same as in the English Acts. Additional benefits, too, are defined as in those Acts. The old age pension begins at the maximum age for insurance—males 65 years, females 60 years. There are a considerable number of clauses safeguarding these various pensions or allowances in appropriate ways.

Part VI of the Bill deals with central finance, and Part VII with the constitution, conduct, and finance of approved societies. Part VIII contains miscellaneous provisions relating mainly to legal matters regarding disputes, offences, and penalties. There is to be a Board of Trustees for national insurance funds, consisting of the chairman of the Commission (who is to be the chairman of the Board), the Solicitor-General of the Commonwealth, the Secretary to the Treasury, the Governor of the Commonwealth Bank of Australia, the Commonwealth Statistician, and the Commonwealth Actuary. The Health Insurance Fund and the Pensions Insurance Fund are to be kept separate, and the Medical Benefit Account is to be kept separately within the former. It is to be constituted at the rate of 16s. in respect of males and 17s. 6d. in respect of females for the total number of persons insured in respect thereto. The Government payments to the National Insurance Trust account are to be as follows: (*a*) an annual amount of £100,000 to the cost of the Commission in the administration of health benefits; (*b*) an amount of 10s. per member to approved societies (other than juveniles) in respect of reserve values till these are extinguished; (*c*) an annual amount of one million pounds for the first five years, thereafter rising by half a million each year till it reaches a maximum of ten millions, then continuing each year at this maximum.

Medical Capitation Fee

It is understood that on matters relating to medical benefit the Commonwealth Government has been in negotiation with the Federal Council of the British Medical Association, and that the capitation fee suggested for medical practitioners who enter the service is 11s. This has not been accepted by the profession, and further information is awaited. The two most important statements made on behalf of the Government in the course of the debate in the House of Representatives have been reported thus: (1) medical benefit may be extended to the dependants of "insured males who have voluntarily contributed to existing benefit organizations which will be subsidized by the Government. More than 700,000 families are affected"; and (2) there is no intention of "appointing doctors to permanent positions under the Bill if the profession declined to work the scheme on account of disagreement about the capitation fee." Both these statements await elucidation.

Reports of Societies

PLACENTAL INFECTION IN MALARIA

A meeting of the Royal Society of Tropical Medicine and Hygiene was held on May 19 at Manson House, Portland Place. Lieutenant-Colonel S. P. JAMES was in the chair and Dr. P. C. C. GARNHAM read a paper on the placenta in malaria, with special reference to reticulo-endothelial immunity.

Dr. Garnham said that a fruitful line of study in present-day malariology was undoubtedly the determination of the process whereby the indigenous inhabitant of a malarial country overcame his infection. The reticulo-endothelium constituted the chief weapon of defence, and hitherto, in man, the study of this system had been largely undertaken in fatal cases of the disease. The placenta appeared to offer much greater facilities for detailed observations, and by the examination of over 500 placentas all phases of the disease had been carefully studied. The placenta, too, was unique, in that in its intervillous spaces parasites and reticulo-endothelial cells alone were present and the inter-reaction of the two could be easily observed.

The well-known picture of schizonts, phagocytes, etc., was found to be absent in the youngest placentas in malaria and to occur only after the fourth month of pregnancy; it was present only in subtertian infections and was absent in quartan. Examination of placentas obtained from cases in different phases of the disease revealed that at the beginning of a new infection no reticulo-endothelial cells were present though schizonts were extremely numerous. The placenta of a patient who had had malaria for a week showed, however, a marked reticulo-endothelial response. In relapses, on the other hand, many reticulo-endothelial cells were found practically from the start, presumably because there was a sensitized apparatus still extant from the original attack. In cerebral malaria there was, surprisingly enough, no intrinsic failure of the cellular mechanism. In chronic malaria the intervillous spaces were occupied almost entirely by myriads of reticulo-endothelial cells and lymphocytes. All stages in the transformation of lymphocytes into the former cells by way of the polyblasts of Maximow were seen, and there was little doubt that this represented their mode of origin. This finding in human beings corroborated the recent work of Taliaferro, Cannon, and Mulligan on the derivation of the splenic macrophages in bird and monkey malaria.

Origin of Placental Phagocytes

The possibility of an origin for the placental phagocytes from local "fixed" cells was excluded (*a*) on histological evidence, and (*b*) as the result of *intra vitam* trypan-blue experiments. This dye was absorbed only by the "fixed" histiocytes and none was ever present in the macrophages. Other authors had shown the remarkable lack of affinity for trypan-blue of the monocytes of the spleen. For this reason it was suggested that certain blockade experiments in malaria had been wrongly interpreted, based as they were upon the assumption that trypan-blue was absorbed by the malarial macrophage. Trypan-blue was shown to have a beneficial effect in chronic malaria. A remarkable feature was the periodicity of its excretion in the urine, a periodicity lasting for weeks and occupying the hours from about 5 a.m. to noon each day.

To see if congenital malaria occurred 404 cases were examined. A quarter of these showed positive placental films. The blood of the infants was examined at birth and after seven days, always with negative results. It must not be forgotten that these cases came from "hyperendemic" areas where immunity was high and acute malignant infections rare.

Immunity and Cellular Changes

Major H. W. MULLIGAN, in opening the discussion, said considerable advances in our knowledge of the immunology of malaria had resulted from the study of experimental avian and simian malaria and of malaria induced for therapeutic purposes in general paralysis of the insane. There was a striking correlation between the acquisition of immunity in malaria and the cellular changes which occurred in the organs. The disappearance of parasites at all stages of malarial infection could be directly correlated with the activity of the differentiated macrophages of the spleen and liver, and to a less extent of the bone marrow. In the initial attack the macrophages were comparatively sluggish and there was a variable destruction of parasites (natural immunity) depending on their virulence; progressive lymphoid hyperplasia ensued, but in the terminal phases of the disease there was great destruction of the lymphocytes. In fatal infections with *P. knowlesi* in monkeys and *P. falciparum* in man no immunity was acquired. In *P. vivax* infections in man and *P. cynomolgi* infections in monkeys the termination of the initial attack ("crisis"), the subsequent low-grade ("developed") infection, and the immunity to homologous superinfection were associated with acquired immunity characterized by a greatly enhanced activity of the macrophages and consequent destruction of parasites.

In acquired immunity the macrophages, which incidentally originated from lymphocytes, were greatly increased both in numbers and activity; this occurred especially in those organs, such as the liver, spleen, and bone marrow, which were strategically placed for the removal of haematogenous material where the blood circulated comparatively slowly. The highly specific nature of acquired immunity pointed to the interaction of specific antibodies in the defence reaction—probably of the nature of opsonins. Attempts to demonstrate these hypothetical antibodies had, however, proved inconclusive. Taliaferro had suggested this was because they were produced in a concentration only sufficient to be operative in certain internal organs, such as the spleen. Dr. Garnham's paper presented new problems. There were unique facilities in the placental sinuses for contact between the blood elements and macrophage cells, but as macrophages were not normally present in the placenta, polyblasts of the lymphocytic-macrophage series must come from outside. The absence of mitosis suggested they did not develop from local deposits of haematogenous lymphocytes and monocytes. Dr. Garnham had suggested that expulsion of the placenta removed from the body an appreciable proportion of its cellular defence with resultant occurrence of parasitaemia and fever which were so common after childbirth. But fatigue and loss of blood also induced attacks in latent malaria, and were more probably the precipitant factors.

Dr. GREEN-ARMYTAGE pointed out that the anatomy of the placenta afforded no real reason why congenital malaria should not be extremely common. Apart from the degenerating syncytial membrane there was trauma, which must ultimately break up the continuity of the ectoderm; in this way congenital malaria might occur through infection from the maternal blood in the sinuses. He had seen only one case of congenital malaria, in a European baby in Calcutta. In his opinion it was the loss of the placenta with its content of macrophages which was responsible for malarial relapses following delivery, and not the effects of fatigue and haemorrhage.

The Humoral Factor

Colonel J. A. SINTON pointed out that Dr. Garnham's work dealt mainly with the cellular factor in malarial immunity, but there was also the humoral factor. In cerebral malaria Dr. Garnham concluded that death did not result from any intrinsic failure of the cellular mechanism, but he noted that unphagocytosed parasitized red cells were of great frequency and only a proportion of the reticulo-endothelial cells contained pigment. In the speaker's opinion this suggested that even a hypertrophied reticulo-endothelial system was relatively ineffective in the absence of some specific antibody or specific sensitization of the macrophages. As suggested by Clark in 1915, he considered the expulsion of the placenta, by ridding the body of parasites, as a factor beneficent to the patient. It was not analogous to the effect of splenectomy in experimental malaria, since in the spleen originated the major portion of the protective macrophages of the body. Recently Barber and Clark had reported in highly endemic areas like Macedonia and Panama that the parasite rate in babies up to 2 months of age was comparatively low. This suggested a temporary immunity due to the passage through the placenta of some inhibitory substance from the mother to the child, or some substance of an immunizing character acquired during lactation. Another possibility was the passage of hypothetical malaria "toxin" through the placenta, resulting in an active rather than a passive immunity.

General Discussion

Dr. G. W. M. FINDLAY said that though the young fibrocytes of the placenta in Dr. Garnham's sections contained trypan-blue this dye was strikingly absent from the placental macrophages. Their cytoplasma stained blue with litmus and readily took up Indian ink, and Dr. Garnham suggested that failure to take up trypan-blue was due to their alkaline reaction. Dr. Garnham's results with vital staining were at variance with those of other investigators, which indicated that an acid and not an alkaline reaction of the cytoplasm of the macrophages would determine the non-appearance of the dye. The reaction of the somatic macrophages to trypan-blue and litmus was very different from that of the placental macrophages as described by Dr. Garnham. If his observations were correct, it was impossible to deduce from the behaviour of the placental macrophages anything in connexion with the behaviour of the somatic macrophages toward trypan-blue or to assert that blockade of the somatic macrophages by this dye was impossible.

Dr. C. M. WENYON said he found it difficult to believe that in chronic malaria the placenta would take over the work of other organs like the spleen, liver, and bone marrow, and that these organs would suddenly resume it when the placenta was expelled at the end of pregnancy. The placenta was a sort of angioma with maternal sinuses through which the blood moved slowly. Malarial parasites circulating in small numbers came into these sinuses, stagnated there more or less, and began to develop as they might have done in a culture tube. They reproduced by schizogony quite apart

from the ordinary process elsewhere in the body. Lymphocytes and macrophages came in, of course, and began phagocytosing infected corpuscles. But though malarial infection of the placenta might be induced it did not reflect itself in the number of parasites in the peripheral blood; in this it differed from cerebral malaria. It would appear that what went on in the placenta did not protect the rest of the body against malaria. The immunizing process was going on in the spleen, and the removal of the placenta was actually removing a great nidus of parasites, and not something which was immunizing against parasites elsewhere in the body.

In reply Dr. GARNHAM pointed out that if macrophages were being conveyed from the spleen, as Major Mulligan suggested, one would expect the peripheral blood to show those cells in greatly increased numbers, but only the lymphocytes were increased in the peripheral blood. Colonel Sinton had suggested that infants did not develop malaria until 2 or 3 months old. In Kenya he found it a fortnight after birth, and by 2 months at least 30 per cent. of the babies were infected. Splenomegaly in Kenya due to subtertian malaria was a comparative rarity. When found it was nearly always associated with quartan or benign tertian malaria. He agreed with Dr. Wenyon's conception of the placenta as an extraneous tumour affording conditions similar to the culture tube; there was certainly a much greater concentration of parasites in the placenta than in the peripheral blood.

Local News

ENGLAND AND WALES

Birmingham United Hospital

The Birmingham United Hospital, consisting of the General Hospital founded in 1766 and the Queen's Hospital founded in 1840, has issued its third annual report. The annual income from all sources rose during 1937 and amounted to £161,705, of which £22,721 represented subscriptions and donations. The ordinary expenditure was £168,265, and reckoning in certain extraordinary receipts and expenditures, the working deficiency for the year comes out at £3,803. In explaining a rise of £10,000 in expenditure the compilers of the report point out that additional departments have been inaugurated and developed and research facilities extended. In the General Hospital a new department for radium-beam therapy has been opened, Lord Austin and Lieutenant-Commander Engelbach generously providing one gramme of radium and necessary apparatus, and the National Radium Commission lending a further gramme. Lord Austin has also provided a fourth deep *x*-ray apparatus. At the Queen's Hospital one outstanding development in 1937 was the establishment of a department of plastic surgery. Birmingham is on the threshold of important hospital developments, and the new hospital at Edgbaston is the subject of a progress report. There will be no unnecessary delay in the assumption by the United Hospital of the responsibilities for the new buildings and service, with the largest possible number of beds for which nursing and domestic staffs can be obtained. From then onwards expansion will take place as quickly as possible, but it is pointed out that to provide an entirely new and complete organization to full capacity will take some time, especially with a hospital of such modern design and containing all the numerous departments connected with the special needs of a medical school.

A Pharmaceutical Jubilee

A luncheon to celebrate the jubilee of Boots Pure Drug Company was held at the Savoy Hotel on June 2. The chairman was Lord Trent, and the company included the Minister of Health (Dr. Walter Elliot), Lord Horder, and several representatives of the medical and pharmaceutical professions. The chairman said that the word "romance" was often misused, but its use was surely justified in describing the progress of the business which was started by his father, Jesse Boot, in Nottingham in 1888. The one small druggist's shop had been multiplied to close upon 1,200, and the one boy assistant had become a staff of 22,000, of whom 7,000 were employed in the factories that supplied the shops. Lord Trent added that the chief pride of his firm was to regard itself as a servant of the community in all matters pertaining to health and cleanliness, and, in its dealings with its workpeople, a modest contributor to that unprecedented social progress which had coincided with its own history. Dr. Elliot, replying to the toast of "His Majesty's Ministers," said that the enterprise conceived in the back street of a provincial town had exemplified many of the qualities which had made the English people great. The country was enormously indebted to the pioneers of industry like the late Jesse Boot, first Lord Trent. Goose Gate, Nottingham, had proved the gate of the goose which laid the golden eggs, and, of course, the Government in the person of the Chancellor of the Exchequer welcomed all such prolific fowl. But such firms were also to be congratulated because they gave the example and set the pace for social developments which in due time the Government adopted for the whole community. A real tribute was due to Jesse Boot as a prince of shopkeepers. Dr. Elliot went on to speak of the vast extent of the pharmacy business and the skill and care of dispensers. Viscount Wolmer proposed the health of "The Guests," and especially welcomed the presence of the President of the Pharmaceutical Society and the Lord Mayor of Nottingham. A response was made by Mr. W. J. Jordan, High Commissioner for New Zealand.

SCOTLAND

Revision of School Health Records

The Department of Health for Scotland has revised the system of school medical inspection and preparation of school health records, and the new scheme is to come into operation in Scotland at the beginning of the next school session. In a circular which the Department has issued to education authorities explaining the new procedure it is pointed out that, while under the existing arrangements much interesting and valuable information has been made available, experience has shown that there are various ways in which improvements can be made. It is not possible under the present system to make full use of the data obtained from school medical examinations because the results are summarized in terms of defects and do not indicate the number of children involved. The new scheme will provide for information being furnished with the object of reviewing from year to year the progress of children with remediable defects. It will also give a clearer picture than has previously been obtainable of the actual physical state of the school population.

Recruitment and Conditions of Service of Nurses

The committee which is inquiring into the recruitment and conditions of service of nurses in Scotland has held two further meetings at which evidence was given by representatives of Aberdeen Royal Infirmary, the Victoria Infirmary of Glasgow, the Educational Institute of Scotland, the Medical Women's Federation, the Royal Medico-Psychological Association, the General Nursing Council for Scotland, and the Royal College of Physicians of

Edinburgh. This completes the oral evidence which the committee is likely to receive, and the committee is now engaged on the preparation of its report.

Presentation to Cupar Doctor

Dr. John Macdonald, who has practised in Cupar, Fife, for forty-six years, was presented on May 27 with an inscribed silver salver and a cheque for 250 guineas, on behalf of patients in the district and colleagues in the profession. Dr. Macdonald, who is a native of Tobermory, graduated M.B., C.M. at Edinburgh in 1883, and after spending some time in London and in assistantships, settled in Cupar in 1892, where he became one of the best-known practitioners and rendered valuable services to the district in the establishment of the Adamson Hospital.

Correspondence

Planning of Maternity Hospitals

SIR,—I am in complete agreement with your eulogy of Queen Charlotte's Hospital, and I am sorry if anything which I have written has given the impression that I have overlooked the work of Drs. Colebrook and Fry and the other members of the splendid research organization at Hammersmith. The application of much of the knowledge which they have given us is now part of the daily routine work of hospital administrators as well as of obstetricians. I do not think there is any serious risk that such an institution will perish of inanition, but hospitals such as this are not going to be built in every little town, and I suggest that we should keep the discussion to the question whether additional new accommodation should be provided in connexion with general hospitals or in independent special hospitals. The "ideological" consideration which prompted my original letter was the desire to see established in the country a *service* which will meet the needs of all women during pregnancy and in childbirth, and not merely care for a selection of the normal cases.

Little special maternity hospitals may be very beautiful institutions, but, like pirate buses, they skim the cream of the traffic and by so doing they increase the difficulties of those who have to provide a service for what is left. It is true that the normal maternity patient is not a sick woman, but a proportion of sick women become pregnant and of pregnant women become sick. If they are not to be admitted to maternity hospitals, where are they to go? Must they be nursed at home, or will they be sent to a general hospital, where presumably there will not be a staff qualified to care for such cases?

Whether there should be separate domiciliary accommodation for the nursing staff attending maternity cases is a matter on which there is a difference of opinion. If it is of vital importance, what is to be done about the housing of the nurses who attend the morbid cases which occasionally occur in the best maternity hospitals?

To take the points of your criticism in order:

(1) I agree that the great bulk of the work of a maternity hospital concerns normal cases. The total maternal mortality is a very small percentage, but I am sure you do not suggest that it is not important.

(2) The medical and surgical complications of pregnancy and labour are relatively uncommon, but it is foolish to ignore them. In Walton Hospital in 1937 there were 2,958 confinements. Among the cases admitted were 222 in which there was some complicating condition apart from the ordinary toxaemias of pregnancy and the complications of labour. This figure included: cardiac disease, 46; pneumonia, 18; pulmonary tuberculosis, 16; acute appendicitis, 2; terminal ileitis, 1; ovarian cyst, 3; erysipelas and cellulitis, 3; renal calculus, 2; chorea, 3; mental disturbance of various forms, 6. In addition, there were 406 abortions. The principal special maternity hospitals may number among their staffs men qualified to treat these cases, but will there be such staffs in the countless little hospitals which will be built if the policy which you advocate is carried out?

(3) The emergencies of a maternity hospital are not invariably obstetrical.

(4) In many maternity hospitals the pathological investigation of the bodies of those who die or are stillborn is very incomplete. In a general hospital this work comes in the routine of the pathological department and a keen obstetrical resident is not tempted to make an examination himself.

(5) There are advantages in treating cases of puerperal sepsis in a ward attached to a medical unit. Hardly any hospitals have a sufficient number of cases of puerperal septic infection to keep a staff of nurses employed exclusively on this work. The variations in the numbers lead to wide fluctuations in the amount of work to be done, but if in the same unit there is a medical ward to which selected medical cases are admitted there is sufficient alternative work to keep the nursing staff together. The nurses can be given special training, they make no contact with normal maternity cases, yet they remain under the direction of the staff of the maternity department. In my experience this arrangement gives the patients the best chance of recovery.

It does not appear to me to be more difficult to build a department of fifty to sixty beds in connexion with a general hospital than as a special hospital. It will certainly be more expensive to build and administer the special hospital. The insignificant size of the maternity units of many of the important general hospitals is due to the fact that the good will, energy, and money that might have made them larger have been diverted to special maternity hospitals. I hope that this mistake will not be made on a large scale in the developing municipal service.

The point in your annotation to which I wished to draw attention was the statement that the recommendation of the Departmental Committee was not in accordance with the lessons of experience. The issue under discussion is of great practical importance, and I hope it will not be decided on inadequate evidence.—I am, etc.,

Liverpool, May 30. HENRY H. MACWILLIAM.

Regional Enteritis

SIR,—I read with interest Mr. W. H. Ogilvie's exciting forecast of surgical things to come, and with attention his comment on regional enteritis (*Journal*, June 4, p. 1193). I have had an opportunity of dealing with three of these cases. The first was one of terminal ileitis; at the time of operation I was unfamiliar with the condition, but judged it to be inflammatory and more likely to settle down than to do anything else. I left it alone. The second displayed that very curious segmental distribution of the enteritis which has been described by several writers. I left this alone too. Interference to have been effective would need to have been very extensive. The third case I encountered a few months ago. It involved the upper jejunum, but in other respects conformed to the first. It was threatening to become obstructive, so I did a short-circuiting operation.

All these patients made rapid and uninterrupted recoveries. Only in the last were the symptoms at all menacing, and anastomosis seemed to be all that was required to put them right. Unfortunately it has been impossible to follow up the first two, and the last has been too recently operated on to be considered out of the wood. She is returning to hospital in a few months for a hysterectomy, which had been arranged for before she developed the enteritis, and there will be an opportunity of examining the bowel. At least it can be said that in none of these cases did the disease "continue to spread," and it can be surmised that resection is not the only line of treatment, especially when it involves such an extensive procedure as removal of caecum and ascending colon as well as small intestine.

Unexplained enteric stenosis is not an uncommon finding. I have seen a multiple stenosis of the ileum which might be explained as an end-result of a segmental ileitis, and another localized stenosis of the descending colon which might have had a similar explanation. Is it possible that fibrosis is the most probable outcome of this type of inflammation, and that it is best facilitated as well as anticipated by anastomosis?—I am, etc.,

London, W.1, June 4. STEPHEN POWER.

Excision of the Patella

SIR,—Does Mr. A. C. F. Halford (*Journal*, May 28, p. 1179) desire to put the standard of bone surgery back to the level at which it was sixty years ago? In the days when Lord Lister worked it might have been considered a severe test to open a knee-joint; but, thanks to the results of his work, to open up knee-joints without introducing sepsis is now the everyday lot of a busy orthopaedic surgeon. In the time of Lord Lister fibrous union, mal-alignment, or late arthritis may have been accepted as the inevitable, or unfortunate, sequel to fracture of the patella. The operation of removal is an attempt to make the function of the knee-joint perfect even after this fracture.

"Damaged tissue can be saved by the antiseptic method." What does this mean? A fracture of the patella may be wired with perfect antiseptic technique, yet aseptic necrosis may give rise to fibrous union. Tilting of the fragments may still take place, leading to friction arthritis; introduced infection is not the usual cause of non-union. Apparently one must learn to accept the fact that the patella, like the appendix, is superfluous—a recessive structure. Mr. Brooke, in his article in the *British Journal of Surgery* (1937, **24**, 733), traces this recession in animals. Fast-moving animals do not require a patella either as part of a lever system or as a protector to the joint. In man, except for kicks or bangs with a hockey stick, the knee does not sustain sufficient direct minor traumata to need a shield for protection. In kneeling, which is probably the most simple common trauma, the patella takes no part; it recedes up into the intercondylar notch of the femur. Patients do not miss the bone after its removal. One of my early and very successful cases was that of a roof plumber; his patella was removed for a comminuted fracture. He now climbs up his ladders with full power of extension, and then crawls about on the slates. In the arthritis cases the loss of protection that may result from removal of the patella is small compared with the relief of pain that follows, since there is no friction between the patella and the intercondylar notch of the femur.—I am, etc.,

London, W.1, May 29. G. O. TIPPETT.

Treatment of Carbuncles

SIR,—Carbuncles and their first cousins, boils, have afflicted humanity since the beginnings of time. Was not Job cognizant of the agony of boils (Job ii, 7)? They are mentioned in Exodus ix, 9–11, 2 Kings xx, 7, and Isaiah xxxviii, 21. They affect indiscriminately men and women, the adolescent and the aged, the poor and the rich, the robust and the debilitated, men largely predominating. Like the common "cold," their treatment has been most unsatisfactory, as witness the "cures," which are vast in numbers.

One procedure in treatment is definitely bad—namely, incision. No pus is evacuated, and spaces are opened for infection to spread both locally and systemically. Sir James Paget was the first to deprecate interference. He once had a patient who, according to Sir D'Arcy Power, refused operation and surprised Sir James by getting better without, and with less disfiguration than those upon whom an operation had been performed. One of the oldest treatments (still practised in rural areas) was the plentiful application of hot fresh cow dung. This was apparently as efficacious as it was painful. In spite of its disgusting nature this treatment is not without interest. The dung, on caking, provided complete physiological rest, a condition so beloved by Hilton, the author of that classic *Rest and Pain*. It also exerted a certain degree of suction, increasing the barrier action of the solid oedema associated with these conditions.

The treatment I bring forward is a modification of that of Dr. J. C. Lyth, advocated in his thoughtful and instructive article in your columns. Since its publication I have used it on five occasions—two on the back of the neck, one on the arm, one on the eyebrow, and one on the thigh.

It consists of the application of a small pad of gauze, soaked in saturated sodium sulphate, on the carbuncle and then hermetically sealing the whole area, and for some distance beyond, with elastoplast and leaving for three days, when it is found that the site is elevated by a collection of blood and pus. The slough is then in most cases lying free in its base, ready for removal with forceps. In four of the cases the surprising feature was the entire absence of pain; in these the skin had disappeared. In the fifth case the pain was described as terrible, but the slough had separated in three days; in this case the skin was not broken. Dressings are continued every three days until healing has occurred. There is little excoriation, which is a common feature in these cases, and the final scar is very satisfactory.

Since Dr. Lyth's article (1935) appeared there have been two very interesting papers by Sir David Wilkie (1936) and Dr. G. Ovens (1937) recommending elastoplast. There is no question but that the treatment by elastoplast, pure and simple, is on sound lines, giving as it does physiological rest and traction. To my mind, however, the objection lies in the fact that pressure is exerted everywhere, including the carbuncle, where pressure should be avoided. In the method described the gauze takes the pressure off the site of the carbuncle. What is far more important, the osmotic pressure of the hypertonic sodium sulphate is enormous compared with that of the elastoplast, and this acts in the opposite direction.

The modifications to Dr. Lyth's method lie in the fact that the dressing is left on for three days instead of being changed every twelve hours, and in the use of elastoplast as a *sine qua non*. The idea of allowing the carbuncle to "stew in its own juice," bathed in "laudable" pus for three days, is not new. I was informed that in Buenos Aires, which has always been up to date, it was customary

as long ago as 1923 to keep compound fractures for days or even weeks without changing the dressings, in the basement of the hospital. In spite of the stench many cases did remarkably well. There is to-day a definite swing of the pendulum in favour of less frequent dressings.

Another interesting feature of sodium sulphate solutions is their freedom from the development of moulds, such as readily grow on the commonly used glycerin and magnesium sulphate. As I understand there are moulds which grow on almost anything, including concentrated sulphuric acid, it would appear that Dr. Lyth has discovered an almost ideal antiseptic. As a matter of interest I have had some sodium sulphate for three years which is only now showing mould formation. Surely further practical uses can be made of this unique property.—I am, etc.,

London, W.1, June 2. A. P. BERTWISTLE, F.R.C.S.Ed.

BIBLIOGRAPHY

Donald, C. (1935). *British Medical Journal*, **1**, 963.
Lyth, J. C. (1935). Ibid., **2**, 903.
Ovens, G. (1937). *Lancet*, **2**, 16.
Wilkie, Sir David (1936). *Practitioner*, **137**, 399.

Multiple Benign Sarcoid and Tuberculous Ulceration

SIR,—The ultimate diagnosis of the case described under the above heading on March 26 (p. 673) was derived from Dr. J. M. H. MacLeod's statement that "microscopical examination showed an architecture which was typical of the multiple benign sarcoid of Boeck," and as Dr. MacLeod not only carried out microscopical examination of the lesions but also had clinical charge of the case during part of the patient's stay in hospital the alternative diagnoses suggested by Dr. John T. Ingram in his letter in the *Journal* of April 16 (p. 872) were hardly likely to be overlooked. As mere reporter of the case I feel that it would be presumptuous of me to question the specialist opinion of Dr. MacLeod and equally presumptuous to wave aside the criticism, born of experience, of Dr. Ingram.

I regret that I have little information to add to that already published, particularly as I do not have my original notes with me in this country. *X*-ray examination of the chest was performed but revealed nothing of significance. The Mantoux reaction was not investigated. As reported, none of the therapeutic measures employed had any appreciable effect upon the skin condition, although the leg showed some improvement, and after some weeks the patient left hospital and was not available for observation in the out-patient department.—I am, etc.,

Glasgow, June 2. R. HOWITT WISEMAN, M.D.

Nasal Sinusitis in Childhood

SIR,—May I be allowed to make one or two comments on the treatment of allergic sinusitis, so interestingly discussed by Mr. J. Bernstien in the *Journal* of May 28 (p. 1180). First, is there such a condition as allergic sinusitis except as a result of secondary infection? There can be no more acute allergy of the nose than occurs during hay-fever at its height, when the nose is entirely occluded and the orifices of the sinuses blocked, but can there be said to be sinusitis? In more chronic conditions where the air-borne protein, as house-dust, is ever present true sinusitis may occur from a secondary infection, as happens sooner or later to all patients with allergic asthma, the oedematous urticarial condition of the mucous membrane favouring this. Group testing with proteins should always be followed by testing for the individual proteins—dust, cat and dog hair, etc.—otherwise there may be a slaughtering of innocents that is quite unnecessary. The avoidance of house dust is impossible, and desensitization should always be carried out, and is remarkably effective.

I do not follow why the patient should sleep with the windows closed, nor the necessity for "a basal diet avoiding salt, wheat and wheat products, eggs, milk, and pork in any form." Surely the dermal reactions can straighten these matters out and avoid such wholesale restrictions as are practically impossible for the hospital class to carry out. While muco-pus usually suggests the presence of micro-organisms, its absence is not proof that the cause of the paroxysmal rhinitis is not of a microbic nature and discoverable with a post-nasal swab. In short, I believe the treatment of these cases of paroxysmal rhinitis is even simpler than Mr. Bernstien suggests. The proteins to which the patient is sensitive can be discovered, and effective desensitization is available. The offending micro-organism can be isolated and the correct vaccine used. The necessity for calcium, vitamins, and especially ephedrine is then avoided. Where the mucous membrane is excessively tender, zinc ionization is extremely effective. Lastly, there will always be a few cases in adult patients that will remain unbenefited by all endeavours. It is in these cases that the removal of spurs and other intranasal deformities at the hands of the rhinologists proves so effective.—I am, etc.,

London, W.1, May 30. FRANK COKE.

Hearing Aids

SIR,—I have been impressed with Mr. Cleminson's article on this subject in the *Journal* of May 21 and I feel it desirable that the medical profession should realize what can be done to assist the deaf and should be able to advise their patients regarding a suitable aid. In the past these matters have been dealt with mostly by certain firms who advertise widely, and we all know of people who have been "persuaded" to buy expensive instruments that have proved of little use.

I have suffered from increasing deafness for the past fifteen years. The simple type of electrical aid proved of comparatively little assistance, and although I practise a specialty in which hearing is not of primary importance I was becoming embarrassing to my colleagues and a trial to my friends. The development of the valve aid has revolutionized the whole position. At medical meetings, dinners, etc., with fifty to one hundred people present, I am now able to hear nearly every word of the discussion, speeches, etc.

I would refer particularly to Mr. Cleminson's remarks on the subject of bone conduction. The Medical Research Council's report No. 219 was issued at a time when there was no firm who made a valve aid fitted with this type of receiver. That is not so to-day. For nearly six months I have used one of the aids illustrated in Mr. Cleminson's article. I have become so dependent on it that I have bought a second instrument as a spare, because I should feel completely lost without it. I should like to point out that people with middle-ear deafness frequently have good bone conduction, a fact which is often not appreciated by firms who make quite excellent air-conduction aids and tend to overlook the usefulness in these cases of bone-conduction aids.—I am, etc.,

Ipswich, May 27. C. H. C. DALTON.

"Cyclopropane Erythema"

SIR,—I was very interested in Dr. Victor J. Keating's report concerning the above (*Journal*, June 4, p. 1235), as I have recently seen an exactly similar case—namely, a rash closely resembling "ether erythema," but rather more rapid in onset and more evanescent, occurring in a female under 30 who had received as premedication omnopon and scopolamine. She was of rather fair colouring, the type which one associates with odd reactions. I have used cyclopropane pretty extensively, but have only once observed the occurrence of any rash.—I am, etc.,

H. W. LOFTUS DALE,
Honorary Anaesthetist, Royal Buckinghamshire Hospital.

June 6.

Sterilization of Syringes

SIR,—I should like to emphasize that if, as referred to by Mr. Delisle Gray in the *Journal* of June 4 (p. 1237), the syringe and needle are thoroughly cleaned immediately after use then all that need be done is to wash through the syringe and needle with water, spirit, and then ether, after which they can be dismantled and dried by shaking in the air. Before use, assemble and wash through with ether, spirit, and boiled water, and then they are ready for use.

My experience is that some medical men think that once they have put down a syringe somebody will clean it for them, and I have even seen a needle full of blood dropped into spirit. This is not, I assume, a rare thing for a locum or a partner to find, nor is it uncommon to hear that "a syringe has become stuck," in mose cases due to the presence of old blood clot.—I am, etc.,

RICHARD A. MANCLARK.

Fetcham, June 6.

Assistance to Medical Students from Austria

SIR,—As the matter is one which concerns the profession as a whole, I enclose hereunder a letter which has been circulated to the Deans of the Medical Schools in the British Isles. If a medical education from the first year could be assured for a group of students in the manner indicated, lives at present deprived of hope and prospects would again have meaning. Homes would also be needed, but it is not to be doubted that medical men and others in a position to do so would be gladly forthcoming as adopters. I hope and believe that the example of the London Hospital will be followed elsewhere.

"We are all very naturally exercised about the treatment and unhappy prospects of our colleagues in Austria. I think there is general agreement in the profession that there is no longer room for any great increase in the number of foreign doctors allowed to practise in this country and that the best we can do, where possible, is to offer asylum to individuals.

"The question of the medical student seems to some of us to be in a rather different category, and I am wondering whether we might not make some concerted effort to provide opportunities for a limited number of Austrian medical students in the British Isles for whom racial origins or political views have made life in their own country no longer possible.

"The London Hospital, I understand from Dr. Clark-Kennedy, the Dean, has generously undertaken to take one student free of charge for the whole of his medical curriculum on the understanding that his board and lodging can be privately provided.

"I would like to offer the suggestion that each medical school should undertake the free education of one student in this way and on these conditions. You will appreciate that this is a very different thing from allowing dilution with Austrian Jewish practitioners who obtain a quick qualification in some university in this country. By the time he is qualified a student entered from the beginning of his course would be eligible for naturalization. By that time, also, we may anticipate that the high figures of entry into the profession will in all probability have fallen off.

"I shall be most grateful if you could bring this suggestion to the notice of your school council."

—I am, etc.,

JOHN A. RYLE.

Cambridge, May 30.

The Kettle Memorial Fund

SIR,—In the issue of your *Journal* dated May 28, 1937, an appeal was made to the friends and admirers of the late Professor E. H. Kettle, F.R.S., for subscriptions towards a Memorial Fund. There has been a generous response to this appeal and a total sum of £730 18s. 6d. has been received. This sum has been invested in 3 per cent. Redemption Stock 1986/96, and a trust fund has been established, with the following trustees: Professor J. H. Dible, Dr. W. E. Gye, F.R.S., Professor G. Hadfield, Professor W. D. Newcomb, and Colonel A. H. Proctor.

It was decided by the Committee that the best method of commemorating Professor Kettle would be by an annual lecture to be delivered in rotation at the medical schools with which Professor Kettle had been associated—that is, the British Postgraduate Medical School, St. Bartholomew's Hospital Medical School, the Welsh National School of Medicine, and St. Mary's Hospital Medical School; and that the choice of lecturers and arrangements for the lecture in any year should be made by the school at which the lecture was to be delivered.

We are informed that the British Postgraduate Medical School have invited Professor W. W. C. Topley, F.R.S., to deliver the inaugural lecture. He has agreed to do so and the lecture will be delivered in the autumn.—I am, etc.,

A. H. PROCTOR,
Secretary of the Memorial Committee.

London, W., June 1.

The M.R.C.P. and Psychiatry

SIR,—A point which perhaps did not receive sufficient emphasis in the letter of "A.M.O." (*Journal*, May 14, p. 1071) is that insistence on possession of the M.R.C.P. as a necessary step to promotion appears to be a policy not general throughout the service of the London County Council, but confined to its mental hospitals department. That it is not demanded by the Hospitals and Medical Services Committee may be inferred from a scrutiny of the list of recent promotions to senior ranks in that service, but why this difference in two departments of one public authority should exist is not easy to understand. On the whole, medical superintendents of mental hospitals enjoy salaries and emoluments on a scale lower than those of London County Council hospitals comparable in size but under the control of the Hospitals and Medical Services Committee, so that, though their responsibilities are presumably considered to be less than those of their confrères in general hospitals, they are none the less expected to attain a higher standard of medical education. Furthermore, in the mental hospitals service not only is the junior medical officer expected to qualify for promotion by passing this stiff examination, but he is also asked to undertake original work, and that he does not do so to the extent which facilities for research in the service offer is to be attributed very largely to the absorption of all his spare time in study and attendance at classes over a long period. In other words, this insistence on possession of the M.R.C.P. by medical officers seeking promotion has nearly succeeded in killing research in the mental hospitals of the London County Council. Is this progress?—I am, etc.,

"MEDICAL SUPERINTENDENT."

May 26.

Medical Notes in Parliament

The Infanticide Bill, which has passed the House of Lords, was read a second time in the House of Commons on May 31 and has been referred to a Select Committee. The Prevention and Treatment of Blindness (Scotland) Bill and the Young Persons (Employment) Bill were read a second time in the House of Lords on June 2. The Mental Deficiency Bill is down for further consideration in the House of Commons on June 16.

The Government will introduce, and hopes to pass this session, a Bill empowering Trade Boards and Agricultural Wages Committees to provide for holidays with pay and enabling the machinery of the Ministry of Labour to be used in the administration of holiday schemes. The Government will consider later the question of general legislation on this subject.

On June 2 Lord Horder moved the second reading of the Funeral Directors (Registration) Bill to set up a register of undertakers or funeral directors, with a board of control over those carrying on this business. The Earl of Munster, speaking for the Government, said there was no cogent medical reason for the Bill. The Public Health Act, 1936, gave powers to local authorities. Lord Horder then withdrew his motion for second reading.

Detention of Mental Defectives

In the House of Commons on May 30 Dr. ELLIOT moved the second reading of the Mental Deficiency Bill. He said that the necessity for the Bill arose from a decision of the Court of Appeal. The case turned on the question of the interpretation of Section 11 of the Mental Deficiency Act, 1913. The Act said that an order should expire at the end of one year unless continued under certain procedure, and the Board of Control considered they had a right to regulate their procedure. Before the Board of Control could continue an order they had to investigate the documents concerned, and the Board, acting on legal advice, had proceeded for many years on the view in general that, provided the consideration of the special reports and certificates had been concluded by the Board, and they had satisfied themselves in due time that the continuation of the order was required, the final sealing and issuing of the order might be done administratively with such reasonable delay as was unavoidable. That view was upheld by a Divisional Court of the High Court, but the decision was reversed by the Court of Appeal. The Government had come to the conclusion that the reasonable latitude of one month should be allowed. The Bill also validated orders which had been invalidated by the previous assumption.

POWERS OF BOARD OF CONTROL

Mr. RHYS DAVIES said that the Opposition did not intend to oppose the Bill. At the same time he thought that Subsection (2) of Clause 1 went very much further than giving an extension of one month to the twelve months provided by Section 11 of the Act of 1913, and there was some apprehension that the subsection would do more than indemnify the Board of Control against errors which had been committed, probably in good faith. He asked if the subsection did not increase the power of the Board of Control to detain persons in institutions, and enabled the Board to do things which they could not do at present.

Were they right in the assumption, looking at the increased figures of mental defectives in this country, that the increase was natural, or did it result from a closer diagnosis and ascertainment of cases? The figures were appalling. The number of mental defectives under care at the end of 1936 was 82,726, and there was an increase of 3,985 under care in 1936 over 1935. Not all these cases would be affected by the Bill, but a considerable number would be so affected. He was rather alarmed to find that the total of imbeciles, idiots, and mental defectives, apart altogether from lunatics, in this country was over 120,000, representing 2.88 per 1,000 of the total population.

Mr. MOREING said there was a tendency now with regard to juvenile delinquents to take the view that the erring of the individual was due to mental deficiency, and such persons were treated under the Mental Deficiency Act instead of being handed over to the jurisdiction of magistrates. That was having an increasing effect on the number of persons being certified for treatment under the Act.

THE EXTRA MONTH OPPOSED

Mr. LOGAN said that he had seen some of these cases lately, and in the majority of them the Board of Control were doing a wonderful work. He was doubtful, however, whether the Board exercised the supervision essential for the welfare of the individuals placed under their care. He did not think that the Board of Control should have any extension of the period. The individual who was taken into a mental institution should, stage by stage, have his condition certified, and at the end of the twelve months it should be possible to know exactly what his condition was. Twelve months was long enough to detain anybody without certification.

Sir FRANCIS FREMANTLE pointed out to Mr. Logan, in regard to patients being sent to an institution always for a year, that there was a definite provision that the Board of Control might direct the order to expire on the quarter day next after the admission. If the Board were carefully watching, as he believed they were, over these cases, they had the power, although they might not always find it advisable to use it, to limit detention to three months. Every provision was made by which patients should be detained only after the twelve months when there was a medical certificate by two practitioners, including one who, at the request of the defective or his parent or guardian, or any relative or friend, had made a medical examination and considered that it was in the interests of the patient that the order should be made. Therefore it was not a case of wrongful detention under the present law so long as the Board of Control were doing their job. The Bill was an administrative requirement. It was quite natural that the administration might from time to time overstep the mark at the end of the twelve months, and in such cases it was advisable to allow the further month. This would not interfere in any way with the patient's release.

Mr. EDE said it was very undesirable that anything should be done which might make the period of detention any longer. It would be better for the Board of Control to collect the papers earlier, so that the decision might be announced within the period for which the certificate ran.

Sir DONALD SOMERVELL said the Government had thought it best, in the interests of the patient, to extend rather than to shorten the time for the medical officers' reports required for the annual review. If the date were put back the medical officer would have to submit the report roughly a month sooner. Under the present scheme the Board would have a certain latitude for the exceptional cases, and for the final making of orders. The reports of the medical officers would come in after the Bill was passed on exactly the same dates as at present, so that in normal cases the whole thing could be disposed of before the end of the quarter day. There was no intention of postponing that procedure.

There was no reason why a patient who should be released on his report would not be released as soon after the Bill was passed as he would now. There might be a case where, on the original report, they would want to refer back for some further report, or because of administrative difficulties the order could not be got out before the quarter day. In such a case it was important to have the extra month. If there were a case in which the Board of Control thought that further inquiries should be made, the Bill gave time to consider all possible questions that might arise. It was better to give the extra month, which the Board had no intention of using for delay, to enable the Board to deal with exceptional cases and give them time for the necessary administrative procedure.

Replying to Mr. Logan, Sir Donald Somervell added that the Board had full power to discharge at any intermediate date. Clause 25 (2) of the Bill said, "Any commissioner shall have power to discharge at any time any person detained in a certified institution or a certified house, or under guardianship under this Act." There was the further safeguard, in addition to the annual and quinquennial reviews, that every case was reviewed by the visiting justices at the age of 21. Where there was a possibility of recovery and the medical officer or visitor under the local authority so advised, there was no reason to believe that that position could not be considered and acted on as promptly after this Bill as before.

Replying to Sir Robert Tasker, Sir Donald Somervell said that at every step the Board of Control acted on medical advice.

The Bill was read a second time.

Nursing Homes in Scotland

The Standing Committee on Scottish Bills, sitting at the House of Commons on May 31, considered the Nursing Homes Registration (Scotland) Bill. On Clause 5 (Inspection of nursing homes) Sir DOUGLAS THOMSON moved to leave out the words "who is not a registered medical practitioner" from the subsection which, as originally introduced, ran, "provided that nothing in this Act shall be deemed to authorize any such officer who is not a registered medical practitioner to inspect any medical record relating to any patient in a nursing home." He said that under the Bill as it stood it would be possible for any local authority inspector or Department of Health officer who was a medical practitioner to inspect the confidential records of any patient in a nursing home. That was not desirable. Patients should be able to go into a home with the feeling that their case records were confidential. The provision in the English Act was the same as in the clause as he proposed to amend it. The committee agreed to the amendment, and after further discussion of the inspection of nursing homes for other purposes the clause as amended was approved.

On Clause 6 (Power to exempt certain institutions) Mr. PETHICK LAWRENCE asked what was intended to be covered by the provision. Sir DOUGLAS THOMSON said it was anticipated that the type of institution which would be exempted would be the large hospitals that were not carried on for profit but were not constituted by special Act of Parliament or by special charter. A local authority was not obliged to leave any of these out, and was entitled to refuse an exemption or to grant conditions to the exemption. The clause was approved.

Sir DOUGLAS THOMSON brought forward a new clause (Power to exempt Christian Science homes). He said it was exactly in the same form as a clause in the Nursing Homes Registration Act of 1927 and was now incorporated in the Public Health Act, 1936. Christian Scientists were obliged to have a doctor in to attend their children when they were ill and also to notify the authorities of infectious and contagious diseases. Exemption could be withdrawn when the Department of Health was not satisfied that the home was properly carried on and supervised. After discussion the clause was withdrawn. The Bill as amended was then ordered to be reported to the House.

Medical Examination of Mental Defectives

On May 31 Mr. T. HENDERSON asked the Secretary of State for Scotland if he was aware that the Scottish Board of Control refused the right of the parents of a person certified by the Board as a mental deficient and an inmate of an institution under the authority of the Board to have an independent medical examination of such certified person; and if he would instruct the Board to grant an independent examination on application being made.

Colonel COLVILLE replied that defectives were not certified by the General Board of Control, but the Board had a statutory duty to review at stated intervals the cases of all certified defectives. On such occasions the Board might obtain a report by one or more independent medical men. They were bound to order the discharge of a patient at any time if they were of opinion that he was not, or no longer was, a mental defective. A parent or guardian might apply in writing to the Board for the discharge of any defective on the ground that his mental condition did not justify further detention, and the Board might, if they thought fit, require the applicant to produce a medical certificate in support of the application. He was not aware of any case in which the Board had refused to comply with the statutory provisions.

Outbreaks of Anthrax in Angus

On May 31 Mr. RAMSBOTHAM, replying to Mr. Westwood, said that during 1937 twenty-two outbreaks of anthrax in Angus, in which twenty-nine animals were affected, were reported by the county authority. In the first quarter of 1938 twelve outbreaks, affecting thirteen animals, were reported. Eight of the 1937 outbreaks, and three in the March quarter of 1938, were probably due to the farms having been infected on previous occasions. The source of infection in the other cases was not definitely traced, but it might possibly have been associated with the use on these farms of artificial feeding stuffs which in fourteen cases were known to have been imported from abroad.

Hospitals in Time of Air Attack

Sir SAMUEL HOARE, in the House of Commons on June 1, moved a Vote for the expenses of air raid precaution services. He said that about 400,000 men and women had volunteered their services. So far as training and first-aid and anti-gas training were concerned, 11,000 doctors, 13,000 dentists, and 22,000 nurses had passed air raid precaution courses. The Ministry of Health had undertaken a survey of the hospital accommodation of the country with a view to air raid precautions. That survey was not complete, but had tended to show that the old distinction between casualty hospitals and base hospitals could not in the conditions of air warfare be fully maintained. It showed that in the organization of the hospital system for air raid precautions the Ministry of Health should be the responsible department. It had been suggested that casualties, instead of being dealt with, say, in the London area, ought to be taken as quickly as possible outside the area of the London attacks, which might be so formidable that it would be difficult for the staff and the doctors of the hospitals to carry on their work. It was also suggested that casualty hospitals ought to be formed on the periphery of London on the lines of the tented hospitals in Étaples during the war, and that as soon as casualties could be moved they ought to be taken to a greater distance. The Government had already tentatively suggested to the Universities of Oxford and Cambridge that they might place the Colleges of the Universities at its disposal.

That was one of several proposals upon which they now wished to come to a quicker conclusion and to have the opinion of experts in the hospitals outside Whitehall. Accordingly he had asked a number of hospital experts to look at this proposal and several other proposals of the same kind and to indicate which they thought most practicable. Those whose opinions he had asked were Sir Charles Wilson, Dean of St. Mary's, Mr. Girling Ball of St. Bartholomew's, General MacArthur, Director-General of Medical Services at the War Office, Sir Frederick Menzies of the L.C.C., and the principal medical experts at the Home Office and the Ministry of Health. As to the protection of hospital personnel against air raids and the precautions to be taken by the boards of management of hospitals, the Home Office would issue directions in the next few days which should be extremely useful to committees and boards of management throughout the country.

Mr. NOEL-BAKER moved the reduction of the Vote. He criticized the proposals of the Government as inadequate.

CONTROL OF HOSPITAL SERVICES

Dr. HADEN GUEST said the first-aid posts must be very close together because unless people who had mustard liquid

on their clothing reached the post in fifteen minutes or, if the liquid were on their hands, in five minutes, they would suffer as mustard gas casualties. To neglect the mustard gas problem would be foolish. He thought the hospitals committee was strong and useful, but it should have been appointed long ago. There was not only the question of providing hospital accommodation but the question of how that accommodation was to be controlled. How were the control and organization of the hospital system in London to be shared between the London County Council and the voluntary hospitals, and in what way was the hospital organization outside the London area to be controlled? There was something to be said for making the control of the hospital services of the country into a national service. The committee appointed by the Home Secretary must consider how the hospital service required for air raid precautions was to be co-ordinated with the hospital services required for civilians and for the Army, Navy, and Air Force. During the war the whole of this country was covered with a network of hospitals to which men were distributed when brought back from the front in France. What extra provision would be required under the conditions of a modern war? Judging by what had occurred in Barcelona, one bomb dropped in a big centre of population in this country might cause casualties equivalent to those caused in a first-class action in the war. Was there any question of increasing the number of hospitals?

Mr. GEOFFREY LLOYD, replying to the debate, said that by the regulations casualty hospitals would be the responsibility of local authorities, while base hospitals were a central Government responsibility.

Colonel NATHAN asked if that applied to voluntary hospitals and municipal hospitals, and Mr. LLOYD said that it applied to all hospitals. On the question of the possible evacuation of the population from London, Mr. Lloyd said time-tables had been worked out with the railway companies that 3,500,000 could be moved fifty miles or more out of London by rail in seventy-two hours.

The Vote for air raid precaution services was then carried by 174 to 95.

General Medical Service for the Nation.—On June 2 Dr. ELLIOT told Mr. Gallacher that consideration was being given to the proposals of the British Medical Association in connexion with national health insurance, including increases in medical and surgical benefits. He was not yet in a position to indicate the attitude of the Government.

Obituary

We regret to announce the death of Dr. ROBERT STEWART MOWAT, which took place suddenly in Edinburgh on May 24. Graduating M.B., C.M.Ed. in 1894, he obtained the D.P.H. of St. Andrews in 1901 and the M.D.Ed. in 1909. He was appointed assistant to the lecturer in medical jurisprudence at University College, Dundee, and subsequently resident medical assistant at Dundee Royal Infirmary. He then returned to Edinburgh, and for forty years carried on a large and successful practice. Dr. Mowat had been a member of the British Medical Association since 1895. A modest, genial, kindly man of great personal charm, and gifted with a keen sense of humour, he was very conscientious and enthusiastic about his work, and ever willing to give sound advice and assistance to a young man commencing practice. Dr. Mowat was familiar with all that is best in our literature. He loved our countryside, and there, without ostentation, he revealed his expert knowledge of botany and natural history. A large number of patients, friends, and colleagues paid affectionate tribute to his memory at the funeral service on May 27. He leaves a widow and one daughter, to whom much sympathy will be extended.

The death took place at his residence in St. Andrews Drive, Glasgow, on May 28 after several weeks of illness of Dr. GEORGE GRAY BUCHANAN, medical officer of health for the county of Renfrew. Dr. Buchanan was born at Kirriemuir in 1881, and after graduating M.B., Ch.B. at Edinburgh in 1902 and taking the degree of B.Sc. in public health in 1904, he became assistant to the professor of public health in Edinburgh University. Later he was appointed assistant to the medical officer of health for Midlothian, and shortly before the war became medical officer of health for East Lothian. After serving in France and India with the R.A.M.C. during the war, he returned to his post in East Lothian, and in 1919 was appointed to the position of county medical officer for Renfrewshire. Dr. Buchanan was a popular and efficient administrator and took a special interest in current methods of disinfection. He is survived by his wife, a daughter and two sons, of whom one is a medical practitioner in Glasgow.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

On June 1 Professor H. R. Dean, M.D., Master of Trinity Hall, was re-elected to the office of Vice-Chancellor for the academical year 1938–9.

At a congregation held on May 28 the following medical degrees were conferred:

M.D.—A. W. Williams, R. M. Bolam, J. H. Cyriax.
M.B., B.Chir.—*M. C. Hounsfield, D. C. Lavender, G. R. C. Peatfield, R. D. Holloway.
M.B.—*G. D. Wedd.

* By proxy.

UNIVERSITY OF LONDON

The Senate on May 18 awarded the degree of Ph.D. in Bacteriology (non-clinical) to F. Himmelweit (St. Mary's Hospital Medical School) and the degree of Ph.D. in Psychology to G. W. Goodall (London School of Hygiene and Tropical Medicine).

UNIVERSITY OF MANCHESTER

Dr. A. D. Macdonald, Leech Professor in Materia Medica, Therapeutics, and Pharmacology in the University, has been appointed Dean of the Medical School from July 31, in succession to Professor H. B. Maitland.

Dr. R. W. Fairbrother has resigned the post of lecturer in bacteriology.

Dr. Raymond Whitehead, lecturer in pathology, has been elected to a Rockefeller Fellowship and has been granted leave of absence for the session 1938–9 while working at the School of Medicine and Dentistry of the University of Rochester, New York.

UNIVERSITY OF ABERDEEN

Professor C. Heymans of the University of Ghent will deliver two lectures in the physiology lecture room, Marischal College, Aberdeen University, on Monday and Tuesday, June 13 and 14, at 5 p.m. On June 13 he will speak on "Some Aspects of Blood Pressure Regulation and Experimental Arterial Hypertension," and on June 14 he will discuss "The Role of the Aortic and Carotid Sinus Presso- and Chemo-receptors in the Reflex Control of Respiration." Professor E. W. H. Cruickshank will be in the chair. The lectures are open to students of the University and others interested in the subject.

UNIVERSITY OF EDINBURGH

Professor B. P. Babkin, M.D., of the department of physiology, M'Gill University, Montreal, will deliver two lectures in the anatomy lecture theatre, University New Buildings, Teviot Place, Edinburgh, on Tuesday and Thursday, June 21 and 23, at 5 p.m. In the first lecture Professor Babkin will deal with "The Regulation of the Secretory Activity of the Gastric Glands," and in the second he will discuss "Conditioned Reflexes: Their Significance in the Light of Recent Work." Students and graduates are invited to attend the lectures.

No. 21.

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended May 28, 1938.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for : (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland. Median values for the last 9 years for (a) and (b).

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for : (a) The 126 (123 in 1937) great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns (9 in 1937) in Northern Ireland.

A dash — denotes no cases ; a blank space denotes disease not notifiable or no return available.

Disease	1938					1937 (Corresponding Week)					1929-37 (Median Value Corresponding Weeks)	
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)	(a)	(b)
Cerebrospinal fever	26	5	13	—	—	24	6	9	2	2		
Deaths		1	2				—	1				
Diphtheria	1,002	128	177	37	16	916	121	174	52	20	908	145
Deaths	29	5	6	6	1	25	4	8	2	1		
Dysentery	50	13	102		—	26	7	4		—		
Deaths				—	—				—	—		
Encephalitis lethargica, acute	3	—	1	—	—	5	—	—		—		
Deaths		—					—					
Enteric (typhoid and paratyphoid) fever	17	2	14	6	—	28	—	6	2	2	30	—
Deaths	—	—	1	—	—	2	—	1	—	—		
Erysipelas			80	10	4			51	7	3		
Deaths		1					—					
Infective enteritis or diarrhoea under 2 years												
Deaths	31	9	17	6	—	60	15	9	5	1		
Measles			380		5*			175		1		
Deaths	16	6	11	1	1	16	—	1	—	—		
Ophthalmia neonatorum	102	11	28		—	94	9	20		1		
Deaths												
Pneumonia, influenzal§	1,082	82	9	4	4	765	74	12	2	4	910	74
Deaths (from Influenza)	39	9	5	—	—	22	5	3	1	3		
Pneumonia, primary			246	6				196	12			
Deaths		24		11	13		13		11	9		
Polio-encephalitis, acute	—	—				1	—					
Deaths		—					—					
Poliomyelitis, acute	5	1	—		—	9	—	—		—		
Deaths		—					—					
Puerperal fever	4†	4	10		1	39	8	8	1	2		
Deaths		1‡					2‡					
Puerperal pyrexia	176	17	21		1	138	19	22		3		
Deaths												
Relapsing fever	—	—			—	—	—	—		—		
Deaths												
Scarlet fever	2,048	218	362	112	114	1,477	144	392	131	39	1,869	245
Deaths	3	1	—	—	—	4	1	2	—	—		
Small-pox	—	—	—		—	—	—	—		—		
Deaths	—	—		—	—	—	—		—	—		
Typhus fever	—	—	—	—	—	—	—	—	—	—		
Deaths				—	—				—	—		
Whooping-cough			80		16			241		5		
Deaths	11	3	2	1	5	11	4	10	1	—		
Deaths (0-1 year)	324	59	67	29	16	351	53	76	25	12		
Infant mortality rate (per 1,000 live births)	54	48				58	44					
Deaths (excluding stillbirths)	4,689	927	680	209	141	4,545	844	627	196	116		
Annual death rate (per 1,000 persons living)	11.5	11.8	13.9	14.1	12.5	11.3	10.5	12.8	13.4	11.1		
Live births	6,973	1,313	996	430	223	7,585	1,353	961	411	254		
Annual rate per 1,000 persons living	17.1	16.7	20.3	29.0	19.8	18.8	16.9	19.6	28.0	24.3		
Stillbirths	291	44				307	41					
Rate per 1,000 total births (including stillborn)	40	32				39	29					

* 5 cases in Belfast alone.

† After October 1, 1937, puerperal fever was made notifiable only in the administrative county of London.

‡ Deaths from puerperal sepsis.

§ Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

EPIDEMIOLOGICAL NOTES*

Enteric Fever

During the week under review there were 17 notifications of enteric fever in England and Wales, compared with 15 in the previous week; 2 were in London—1 each in Fulham and Wandsworth. In Scotland 12 cases of typhoid fever were notified—9 in Roxburgh County belonging to the Hawick outbreak, and 1 each in Dundee, Edinburgh, and Glasgow, where there was 1 death during the week. The source of the Hawick outbreak has now been traced: an employee of the local co-operative store has been found to be a carrier and has been isolated since May 17. It was shown that he handled foodstuffs which had been taken by practically every person who contracted typhoid in the outbreak. Although the water supplies were found to be above suspicion, it was decided to continue chlorination in the meantime.

Diphtheria and Scarlet Fever

In England and Wales notifications of diphtheria during the week dropped from 1,110 to 1,002, while in London they fell from 164 to 128. Small decreases were noted in Eire and Northern Ireland, but an increase was reported for Scotland. Deaths in the 126 Great Towns of England and Wales rose from 26 to 29, and in London from 1 to 5. Of the 29 deaths recorded in England and Wales 2 each occurred in Darlington, Keighley, and Liverpool. Of the 6 deaths recorded in Scotland there were 5 in Glasgow and 1 in Edinburgh. There was a slight rise in the notifications of scarlet fever in England and Wales and in London. For England and Wales the figures were in excess of the median value for the last nine years, but in London they were considerably less. Notifications in Scotland dropped from 485 to 362, while in Northern Ireland they rose from 91 to 114 and in Eire they remained at 112 for both weeks.

Primary and Influenzal Pneumonia

There was a definite fall in the notifications of primary and influenzal pneumonia in England and Wales, and in London. The figures both for England and Wales and London remained in excess of the median values for the last nine years. Fewer deaths from influenza were reported in England and Wales, London, and Scotland. In the West Riding (Yorks) 140 (171) cases were notified, of which 44 (64) were in Sheffield and 24 (27) in Leeds. In Warwickshire there were 61 (78) cases, of which 36 (51) were in Birmingham. Of the 186 (210) cases reported in Lancashire 49 (49) were in Liverpool and 42 (62) in Manchester. Of the 39 deaths from influenza in the 126 Great Towns of England and Wales 5 (2) were in Kingston-upon-Hull and 2 each in Manchester (2), Stockport (1), Birmingham (4). In Scotland 246 cases of primary pneumonia were notified, compared with 252 in the previous week; there were 9 cases of influenzal pneumonia (1 more than in the previous week) and 5 deaths, of which 2 occurred in Dundee and 1 each in Edinburgh, Hamilton, and Falkirk. There were 11 deaths from pneumonia in Eire, of which 9 were in Dublin and 2 in Limerick. There were 13 deaths from pneumonia (the same as last week) in the ten principal towns of Northern Ireland, 11 in Belfast, and 1 each in Londonderry and Portadown.

Measles and Whooping-cough

In the 126 Great Towns there were 16 deaths from measles, compared with 26 in the previous week; of these, 6 (10) occurred in London, and 1 each in Kingston-upon-Hull (2), Leeds, Newcastle-upon-Tyne (2), Doncaster, Bolton, Southampton, West Ham, Preston, Sheffield, Coventry. During the week 949 cases were reported from the L.C.C. elementary schools, compared with 942 in the previous week. The average daily admissions to the L.C.C. fever hospitals were 46, compared with 30 in the previous week, and the number of cases of measles under treatment in these hospitals on Friday, May 27, was 1,282, compared with 1,364 on May 20. On the same day there were under treatment in the L.C.C. fever hospitals 1,009 (1,070) cases of diphtheria, 841 (843) of scarlet fever, and 272 (275) of whooping-cough. Notifications for the week ended May 28 in the eleven metropolitan boroughs in which measles is notifiable were 460 (348), distributed as follows: Battersea 45 (25), Bermondsey 20 (19), Finsbury 35 (19), Fulham 55 (28), Greenwich 104 (95), Hampstead 18 (13), Lambeth 45 (52), St. Pancras 74 (41), Shoreditch 20 (15), Southwark 23 (13), Stepney 21 (28). In Scotland 380 cases of measles were notified, compared with 382 in the previous week; the figures for Glasgow were 123 (129), Dundee 65 (63), Lanark County 45 (38), Aberdeen 44 (36), Falkirk 38 (36), Kirkcaldy 37 (34), Edinburgh 13 (24). During the week there were 11 (10) deaths from measles in the 16 principal towns of Scotland: of these, 5 (3) occurred in Dundee, 4 (3) in Glasgow, 2 (2) in Aberdeen. In Northern Ireland there was 1 death from measles, in Londonderry County Borough; and in Eire there was 1, in Dublin.

In England and Wales there were 11 (17) deaths from whooping-cough during the week under review, of which 3 (1) occurred in London. In Scotland 80 cases of whooping-cough were notified, compared with 59 in the previous week, while the deaths remained at 2—1 each in Greenock and Motherwell and Wishaw. In Northern Ireland 16 (7) cases of whooping-cough were notified with 5 (2) deaths, 3 of which were in Belfast.

Cholera

During the week ended May 28 18 cases of cholera were notified in Shanghai. In the same week in Burma there were 6 cases with 4 deaths, and in Indo-China there were 32 cases. During the previous week—that is, week ended May 21—there were 125 cases with 47 deaths reported in Calcutta, 2 cases with 1 death in Bassein, 1 case with 1 death in Rangoon, 10 cases with 17 deaths in Delhi, 7 cases with 2 deaths in Cawnpore, and 1 case with 1 death in Allahabad.

Plague

During the week ended May 28 there were in British India 3 cases of plague with 3 deaths (in Bassein); in Burma there were 5 cases with 3 deaths. On May 26 1 case of plague was reported in Egypt (in the province of Asyut). During the week ended May 21 18 cases of plague were reported in the Union of South Africa.

Small-pox

During the week ended May 28 5 cases of small-pox were reported in Shanghai. During the same week 12 cases were notified in Burma, 2 in British India (1 each in Bassein and Rangoon). In the previous week 27 cases with 22 deaths were reported in Bombay, 27 cases with 12 deaths in Madras, and 76 cases with 66 deaths in Calcutta.

Typhus

During the week ended May 28 3 cases with 2 deaths were reported in Alexandria and 3 cases in Palestine (1 in Jaffa and 2 in the rural districts). In the previous week in Morocco there were reported 175 cases of typhus with 12 deaths, mainly distributed as follows: Chaouia 48 cases, 3 deaths; Marrakesh 37 cases, 1 death; Oued Zem 32 cases, 6 deaths; Casablanca 18 cases; Agadir 10 cases; 7 each in Doukkala and Rabat. During the same week—that is, week ended May 21—there were 8 cases with 1 death in Alexandria; in Shanghai there were 64 cases with 8 deaths; in Palestine there were 8 cases. During the week ended May 7 100 cases of typhus with 3 deaths were reported in Poland, mainly distributed by departments as follows: Stanislawow 15 cases; Nowogrodek 13 cases; 12 each in Lublin and Wolhynia; 10 each in Lwow and Wilno; 5 each in Bialystok, Kielce, and Tarnopol.

* Except where otherwise mentioned figures in parentheses refer to the week preceding the one under review.

Medical News

Dr. T. H. Sanderson-Wells has endowed an annual lectureship at the Middlesex Hospital Medical School, expressing a wish that the subject to be dealt with should cover the field of the relations between rheumatism and dietetics. The inaugural lecture on Monday, June 20, at 4 p.m., at the Middlesex Hospital, will be given by Dr. Sanderson-Wells, and the second lecture, in 1939, by Major-General Sir Robert McCarrison.

The Imperial Tuberculosis Bureau, in co-operation with the East India Association and the Over-Seas League, is sending out invitations to a lecture, "Tuberculosis: a Key Problem of India," to be given by Major-General Sir John Megaw, Chief Medical Adviser to the Secretary of State for India, on Tuesday, June 21, at 4.30 p.m., at St. Andrew's Hall, Over-Seas House, St. James's, S.W. The chair will be taken by the Marchioness of Linlithgow.

The German Society for Psychology will hold its sixteenth congress at Bayreuth from July 1 to 4, when the chief subject for discussion will be Character and Education. Further information can be obtained from Dr. O. Engelmayer, Hochschule für Lehrerbildung, Bayreuth.

The eighth conference of the International Committee of Military Medicine will be held in Luxembourg from July 1 to 4. A simultaneous meeting on international law, organized by the International Law Association, will discuss legislative questions relating to aerial protection, and another will discuss the scientific study of aerial defence against war gases. Invitations to take part in the conference are given to all naval, military, and air medical officers, whether serving or retired, at home or abroad; in view of the wide range of the programme technicians are also invited. The fee for membership is 25 Belgian francs for all who are not official delegates of their Government. Reductions in travelling expenses are obtainable. Further information may be had from Colonel Voncken, Office International de Documentation de Médecine Militaire, Liége.

The next meeting of the German Ophthalmological Society will be held in Heidelberg from July 4 to 6, and the ninety-fifth congress of German naturalists and doctors in Stuttgart from September 18 to 21.

The third Congress of the Austrian Society for Roentgenology, which was to have been held from September 23 to 25, and the Congress of the Austrian Urological Society arranged for June, will not take place. The sixty-second international postgraduate course on the progress of medicine with special reference to treatment will be held in Vienna from September 26 to October 8.

The Croydon Town Council has decided not to allow fairs to be held in future on Bank Holidays at the Shirley Hills, which form part of the gathering ground for the Addington Well—the well from which infection in the recent outbreak of typhoid fever is believed to have spread. The council has also accepted the recommendation of its Typhoid Committee that a special advisory committee of six members of the Public Health Committee and four doctors should be appointed.

After a long discussion Salford City Council on June 1 approved a recommendation of its Finance Committee authorizing the Health Committee to spend an additional £3,825 during the current financial year to cover the cost of the introduction, as from July 1, of a 48-hour working week for nursing staffs under the control of the Health Committee.

The notification of undulant fever and psittacosis has recently been made compulsory in Argentina.

Dr. Karl Koller of New York, a native of Vienna, who introduced cocaine as an anaesthetic into operative ophthalmology, celebrated his eightieth birthday on December 3, 1937.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone, unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the *British Medical Journal* must communicate with the Secretary, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad

All communications with reference to ADVERTISEMENTS should be addressed to the Advertisement Manager. Orders for copies of the *Journal* and communications with reference to subscriptions should be addressed to the Secretary, B.M.A. House, Tavistock Square, W.C.1.

The TELEPHONE NUMBER of the British Medical Association and the *British Medical Journal* is EUSTON 2111.

The TELEGRAPHIC ADDRESSES are
EDITOR OF THE *BRITISH MEDICAL JOURNAL*, *Aitiology Westcent, London.*
SECRETARY, *Medisecra Westcent, London.*

The address of the B.M.A. Scottish Office is 7, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh;* telephone 24361 Edinburgh), and of the Office of the Irish Free State Medical Union (I.M.A. and B.M.A.), 18, Kildare Street, Dublin (telegrams: *Bacillus, Dublin;* telephone 62550 Dublin).

QUERIES AND ANSWERS

Sterilization of Syringes

Dr. N. PINES (London, E.1) writes: It seems to me from recent correspondence in the *Journal* that some members of the medical profession in this country and abroad are still vexed by this problem. I solved it many years ago to my complete satisfaction by adding some thymol to the methylated spirit in any proportion from 1 in 1,000 to 1 in 100. Thymol is readily soluble in alcohol, does not corrode the metal, and is one of the most powerful disinfectants in existence. It is strongly irritant to the tissues, and therefore the syringe must be washed out with freshly boiled water before use.

LETTERS, NOTES, ETC.

Baby Week

The National Baby Week Council, since its foundation in 1917, has worked to improve the maternity and child welfare services, and to educate the public in the means of maintaining health during pregnancy and bringing up healthy children. Its efforts have, of course, received great impetus from the national movement for physical fitness. It is endeavouring to organize "Keep Fit" classes at all infant welfare centres, the object being to give expectant mothers instruction in suitable physical exercises in company with other women. It should be quite easy for classes similar to those arranged by the Women's League for Health and Beauty, the Margaret Morris Movement, and the physical education classes organized by education committees, to be conducted at maternity and child welfare centres. Weekly exercise would not be sufficient, but the mothers would soon be enthusiastic enough to carry out at home the exercises they had learnt at the centre. Systematic exercises can also benefit the young child, and the Council also advocates provision of playgrounds for toddlers. It suggests that women's institutes should offer their places of meeting for "Keep Fit" classes, and that where a suitable hall is not available at the centre local co-operation can arrange for one elsewhere to be used. The Central Council for Recreative Physical Training is willing to provide qualified leaders as instructresses.

In the *Journal* of May 21 (p. 1120) we announced the constitution of the International Academy for Medical Postgraduate Work. The address of the Permanent Bureau is Robert Koch Platz, 7, Berlin, N.W.7.